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*lions and tigers*  
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*soldiers*  
*sounds*  
*big animals*  
*under the ground*

*apes and monkeys*  
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*air*  
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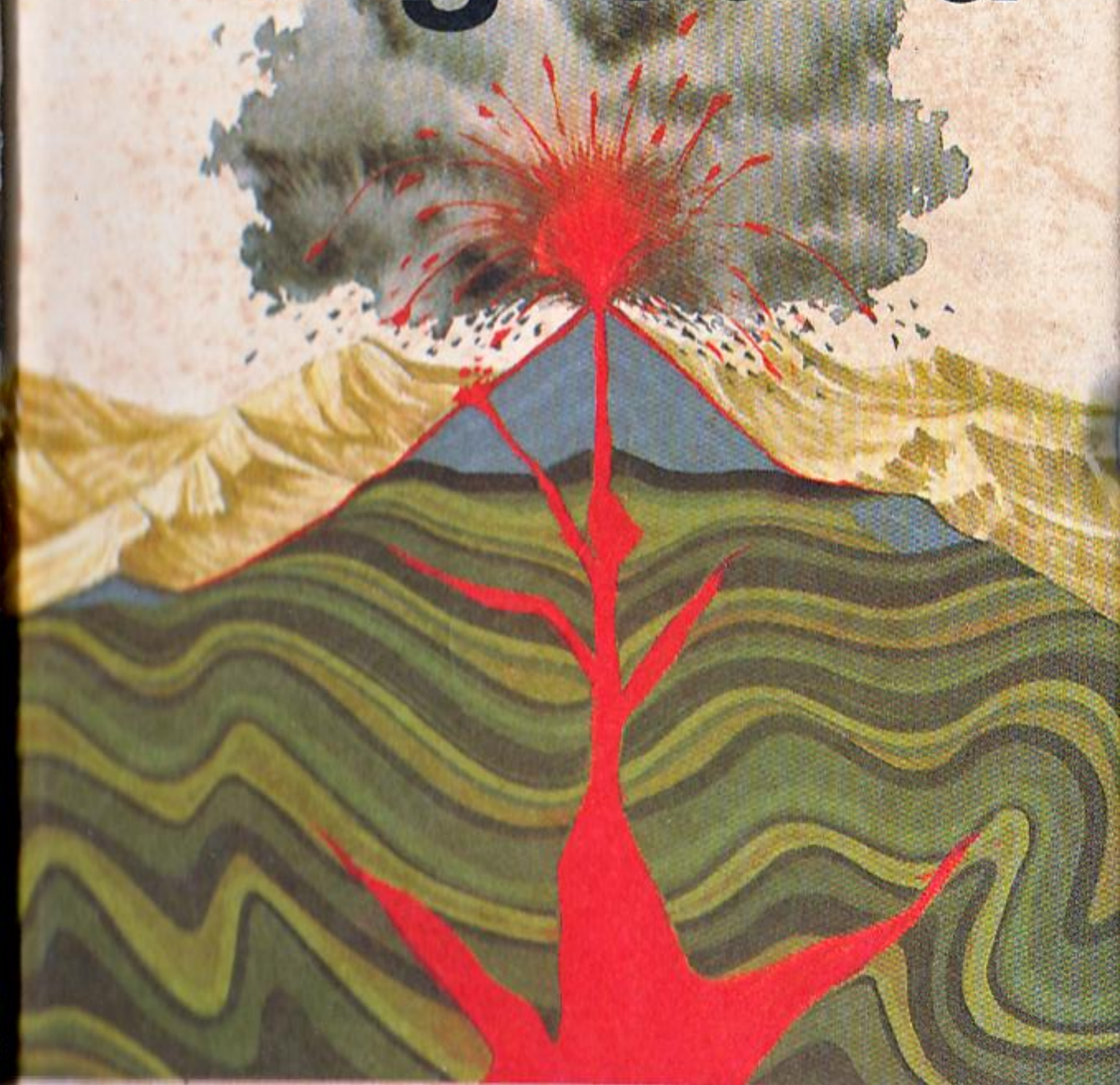
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under the ground

LADYBIRD LEADERS



# under the ground







## to teachers and parents

This is a LADYBIRD LEADER book, one of a series specially produced to meet the very real need for carefully planned *first information books* that instantly attract enquiring minds and stimulate reluctant readers.

The subject matter and vocabulary have been selected with expert assistance, and the brief and simple text is printed in large, clear type.

Children's questions are anticipated and facts presented in a logical sequence. Where possible, the books show what happened in the past and what is relevant today.

Special artwork has been commissioned to set a standard rarely seen in books for this reading age and at this price.

Full-colour illustrations are on all 48 pages to give maximum impact and provide the extra enrichment that is the aim of all Ladybird Leaders.



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A Ladybird Leader

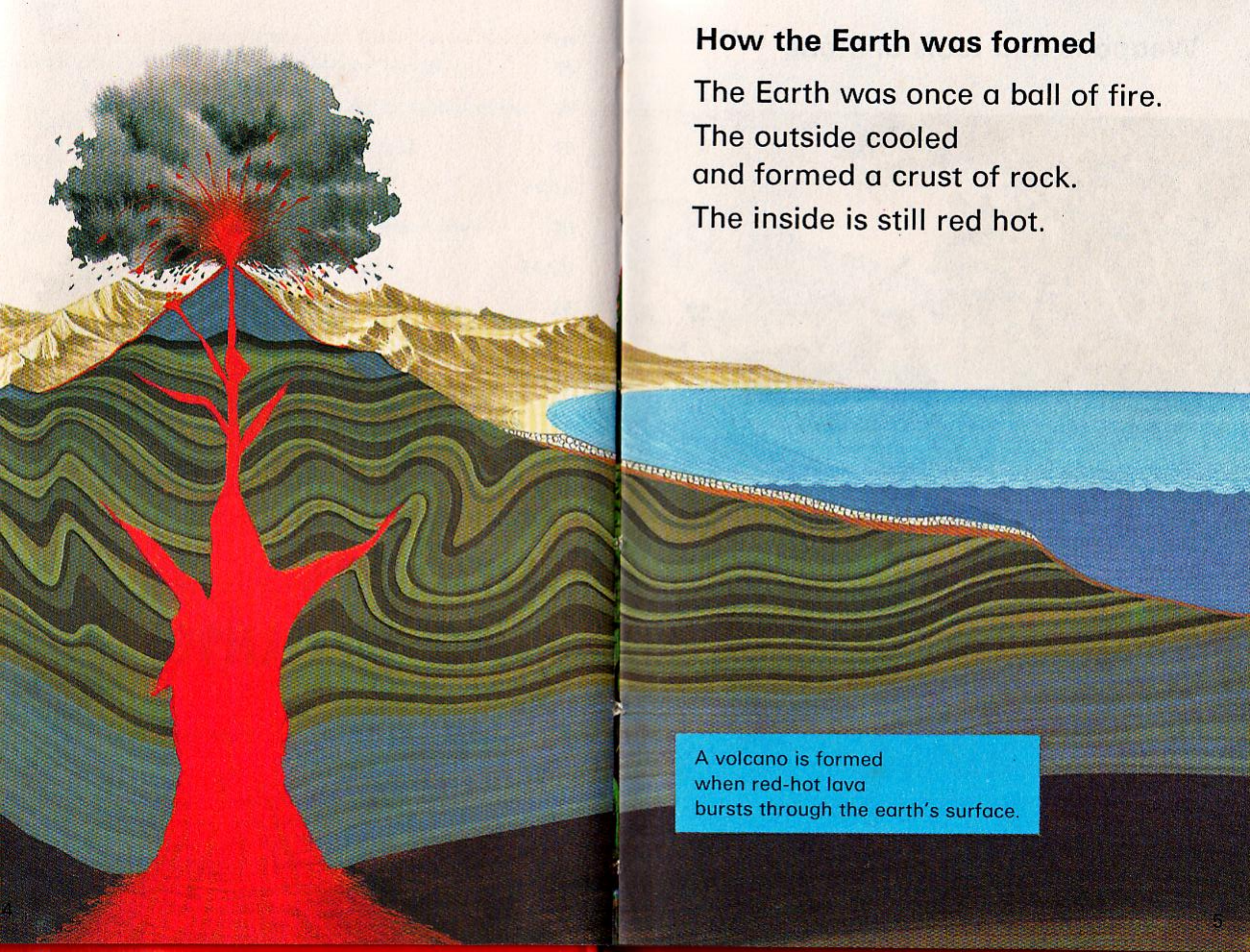
# under the ground

written by James Webster

illustrated by Gerald Witcomb, Frank Humphris  
and David Palmer

Ladybird Books Loughborough





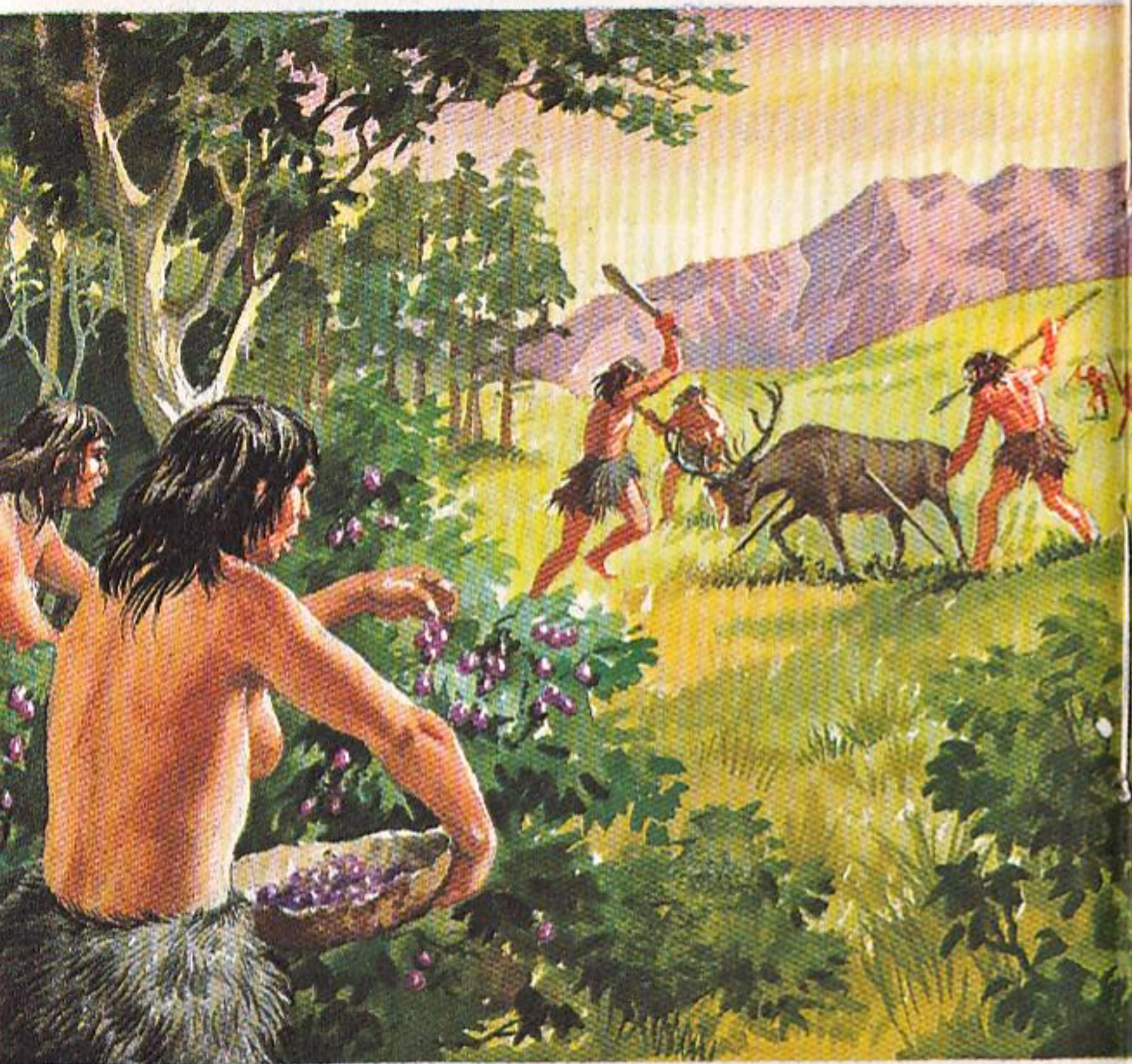
## How the Earth was formed

The Earth was once a ball of fire.  
The outside cooled  
and formed a crust of rock.  
The inside is still red hot.

A volcano is formed  
when red-hot lava  
bursts through the earth's surface.



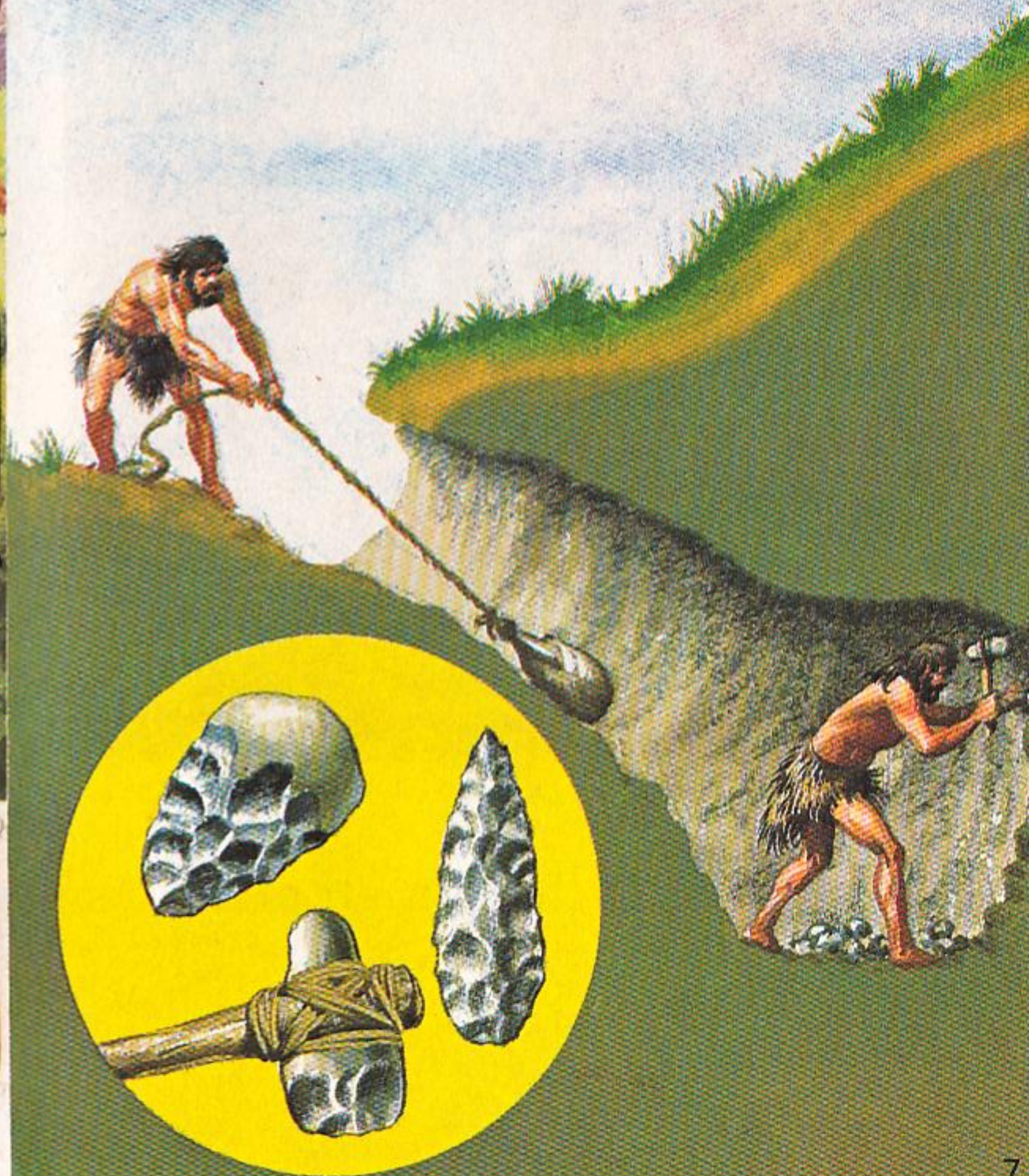
## Weapons and tools of stone



The first men and women ate plants and berries, and killed animals for food. They used flints (hard stones) for axes, hammers, spears and arrow heads.

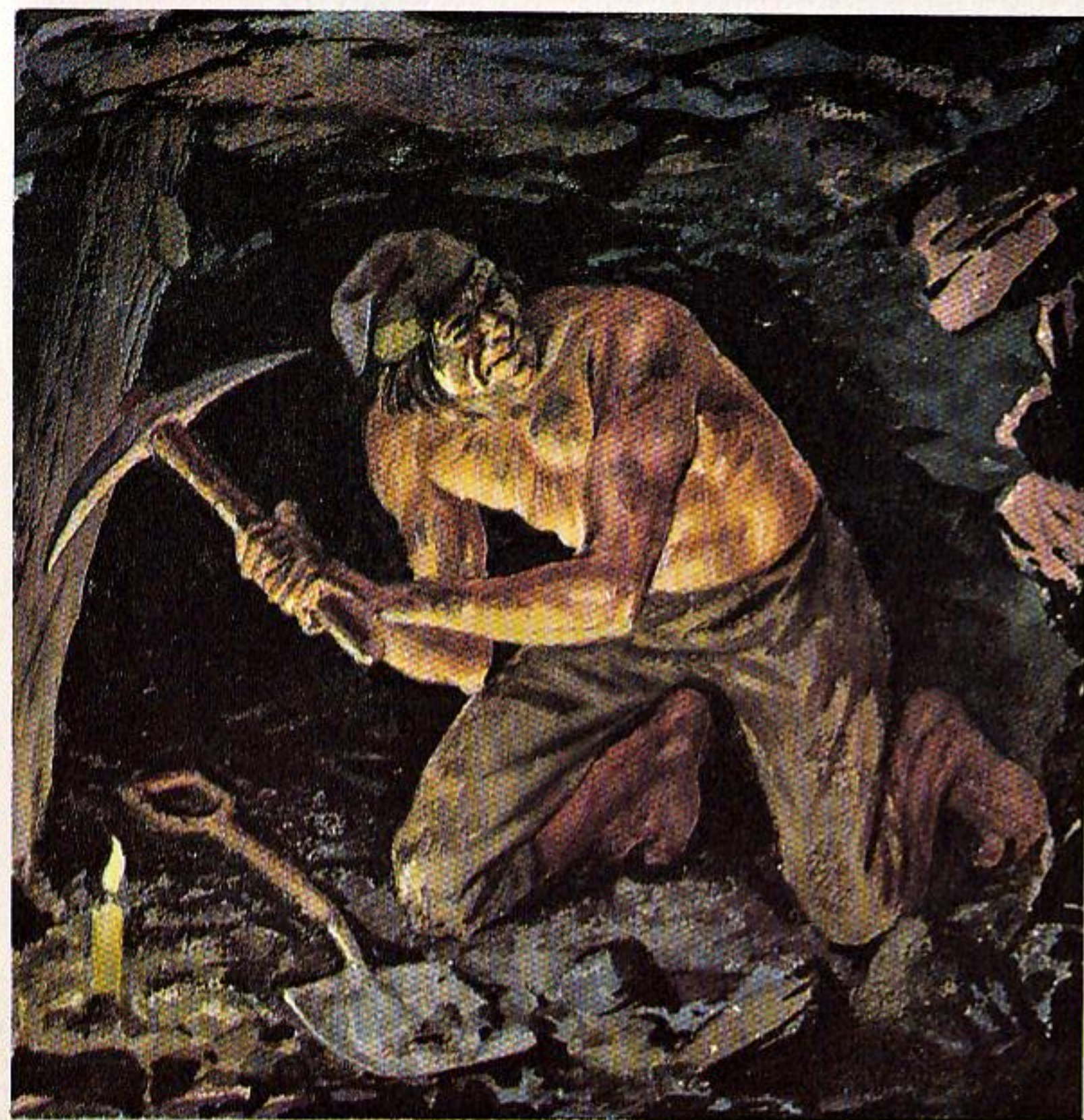
## The first mines

To get the flints, deep holes were dug. These were the first mines.





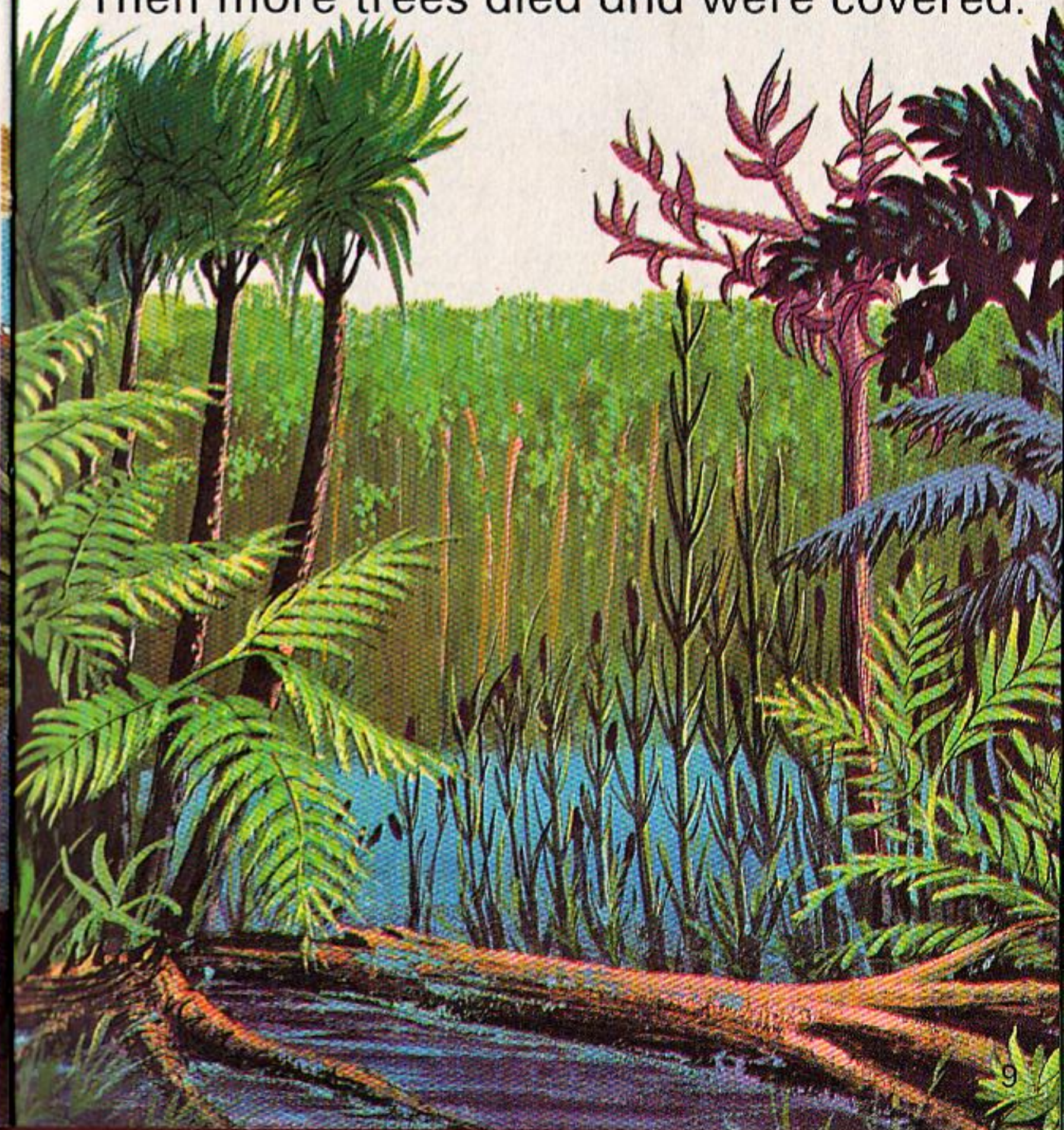
## Deeper mines



Later, men had metal shovels and picks and could dig deeper holes to get tin, copper, iron and coal.

## Coal

Long before there were men and women, forests were growing in the world. Trees died and rotted in swamps. Many layers of mud covered them. Then more trees died and were covered.





## Bigger mines



Modern mines are very big.  
Machines do much of the work.  
Everything possible is done  
to make mining safe.

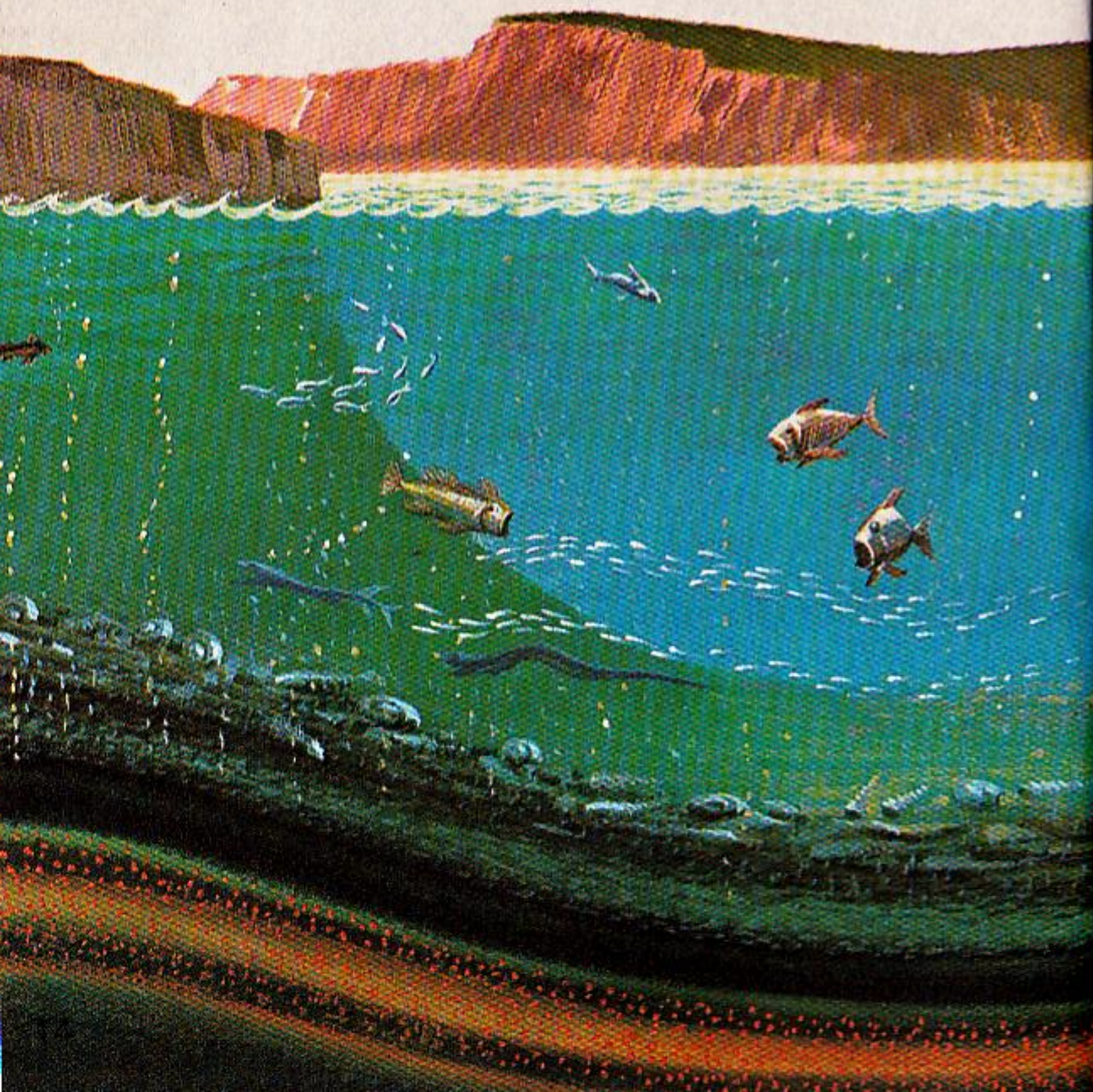


But mining can still be dangerous.  
A gas (called firedamp) sometimes  
explodes. A tunnel roof may fall in.  
Water may flood a tunnel.

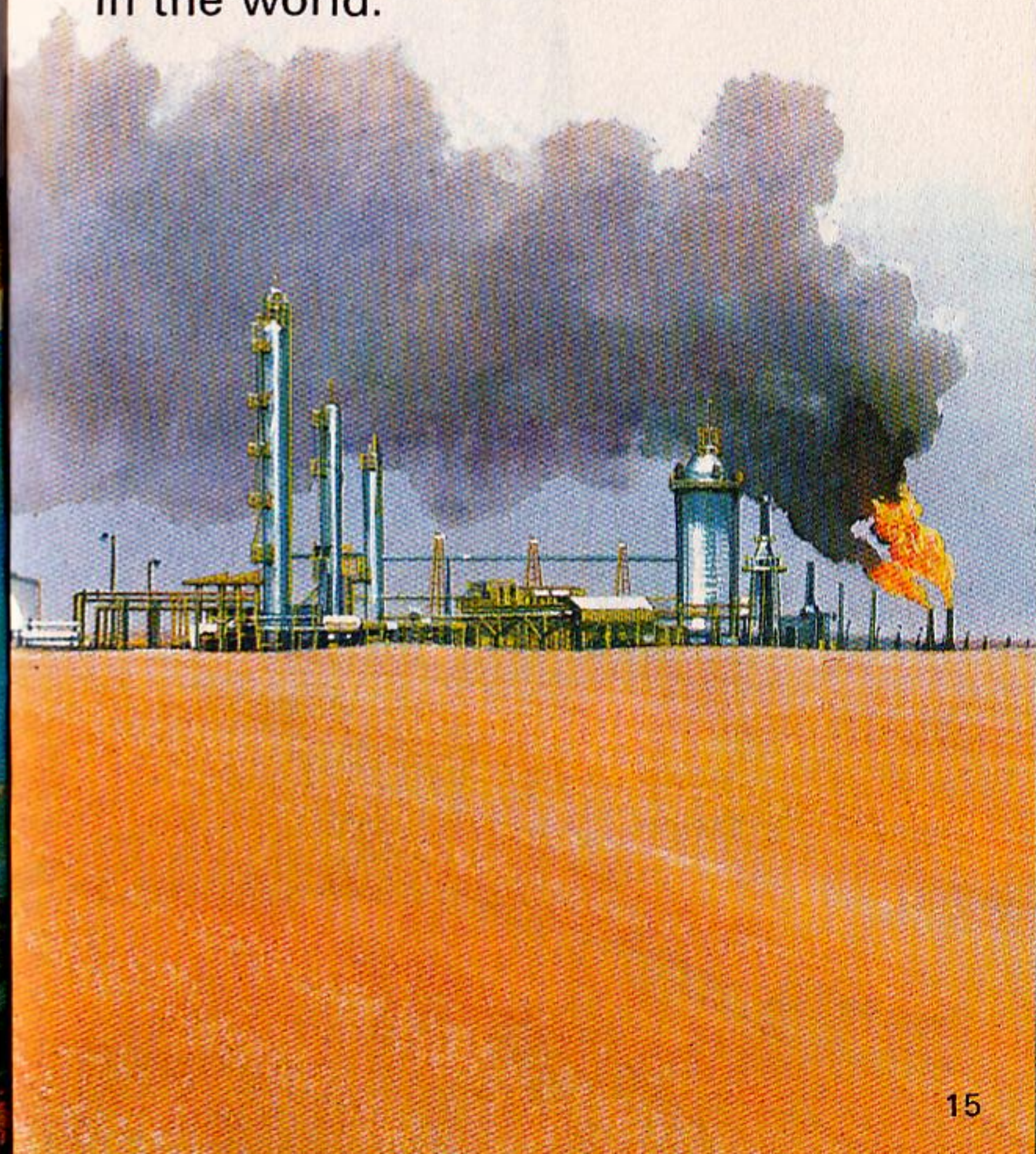


## Oil

Millions of years ago,  
tiny sea creatures died  
and sank to the sea bed.  
Mud and sand sank on top of them.  
Slowly their bodies changed into oil.



Today, oil is found under the sea-bed  
and where the sea used to be.  
There is oil under this desert.  
Find out where there are oilfields  
in the world.

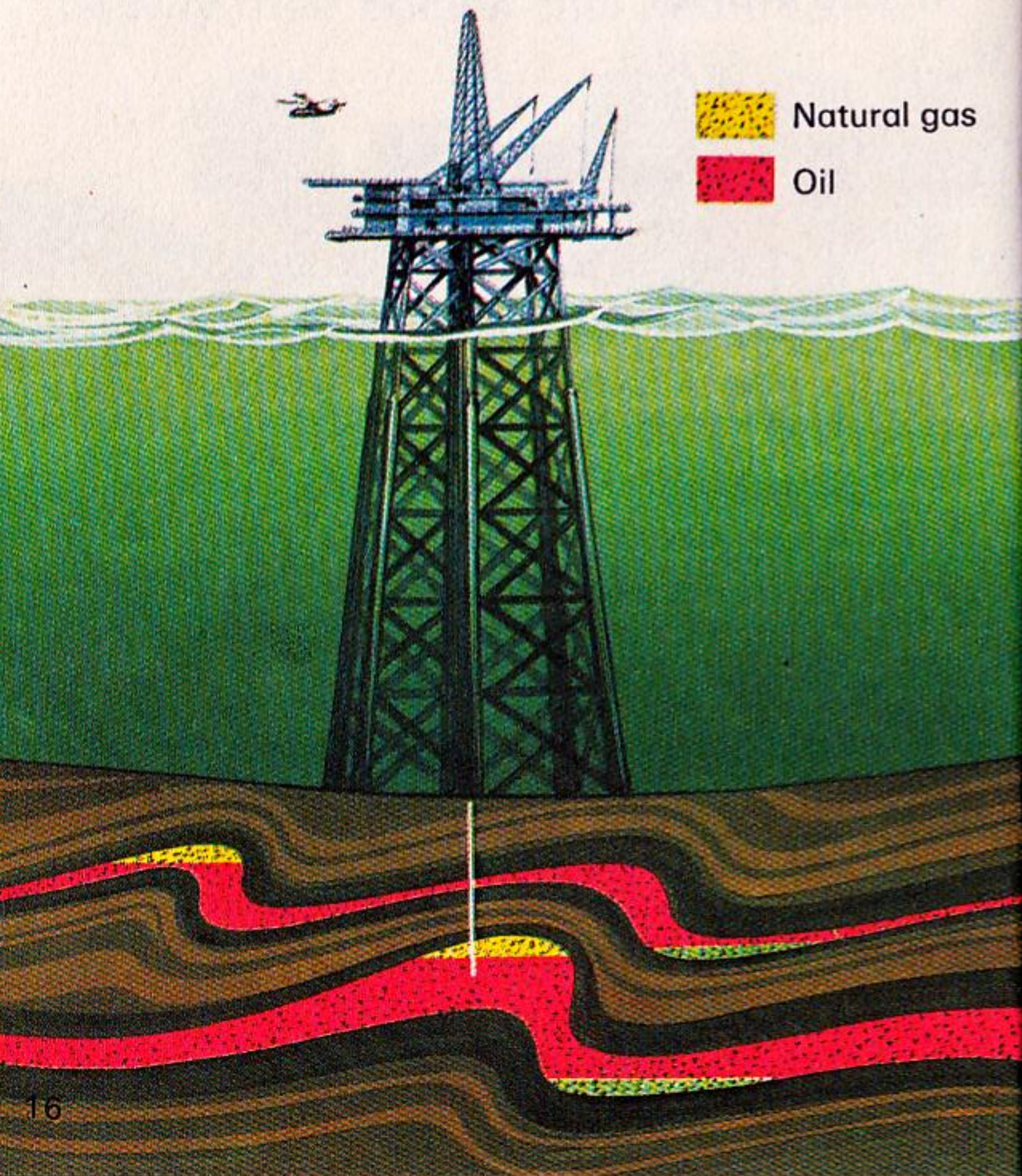




## Natural gas

Natural gas, as well as oil, is found under the sea-bed.

Oil rigs like this are used to drill under the sea.



Men live and work on these rigs.  
Helicopters and ships  
bring food and other things they need.





## Metals and precious stones

*Silver brooch  
with topaz*

*Gold ring  
with diamonds*

*Gold watch*

*Copper  
bracelet*

*Gold ring  
with sapphire stones*

*Platinum bracelet*

Some kinds of rock have minerals in them. Iron, copper, silver, gold and other metals are all minerals.

Diamonds and other precious stones are minerals. This jewellery was made with minerals from under the ground.



# Salt



Millions of years ago,  
when a sea or salt-water lake dried up,  
the salt was left behind.  
Later it was covered by mud and rock.  
Today we dig it out.

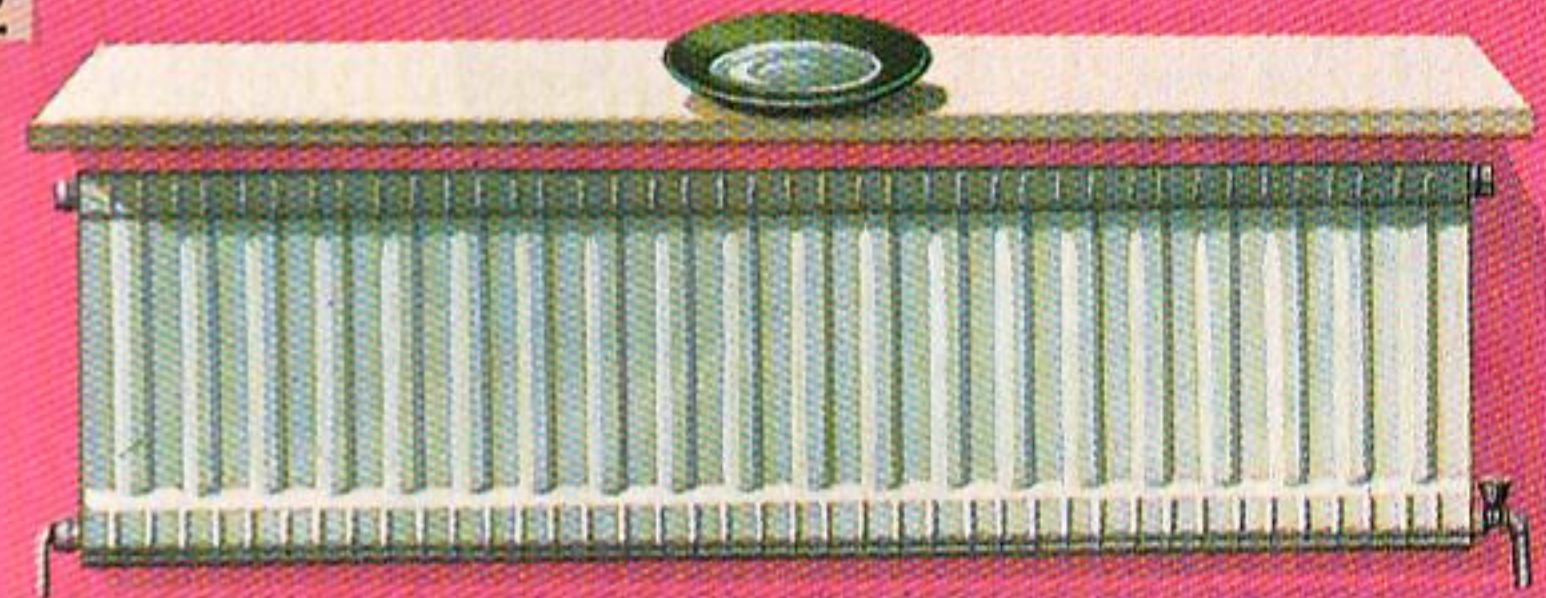
## See what happens

1



Put some very salty water  
in a saucer.

2



Leave the saucer in a warm room.

3



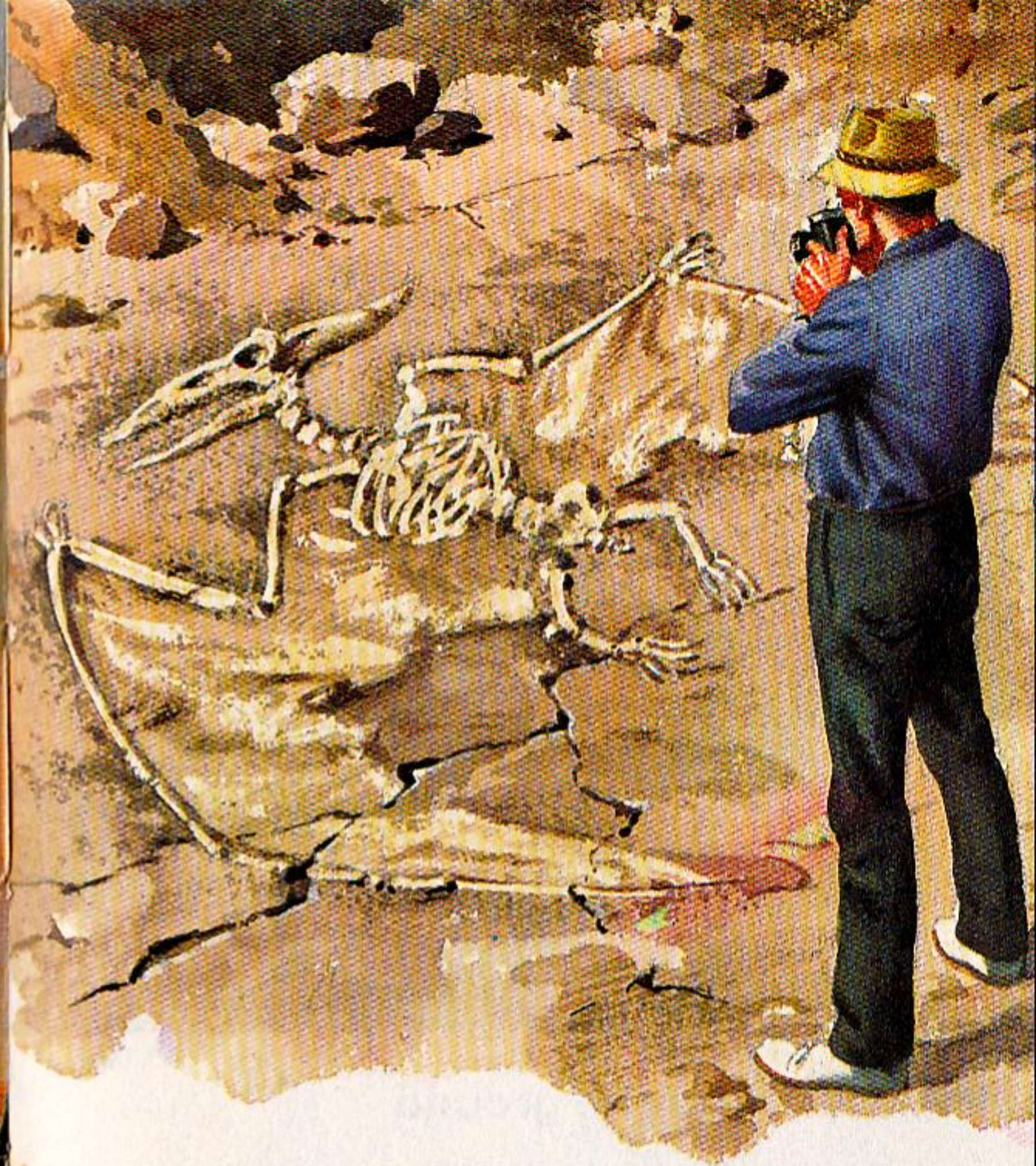
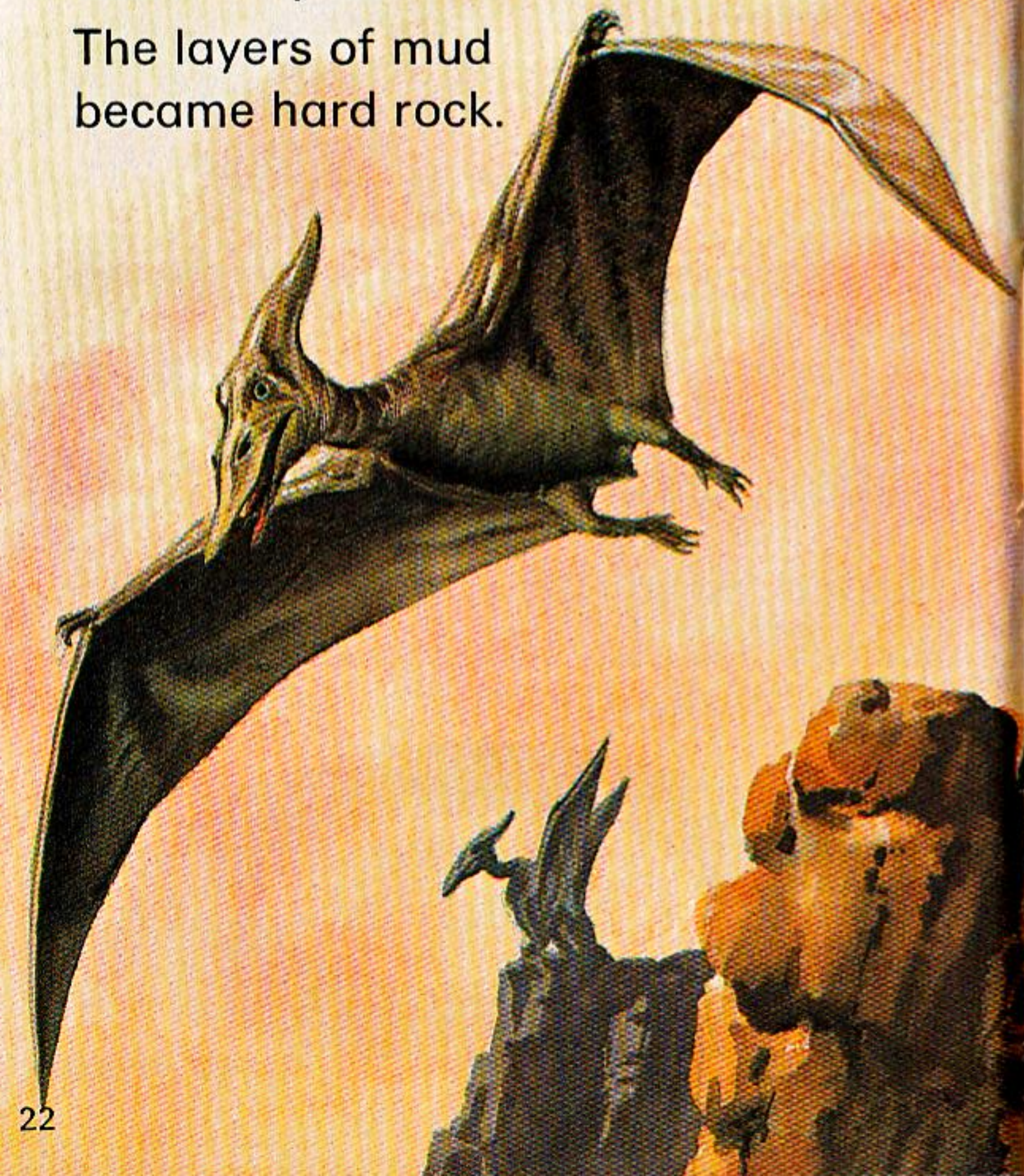
See what happens  
when the water dries up!



## Fossils

Once there were animals like this.  
When they died, some were covered  
by mud.

The mud pressed round their bodies.  
The layers of mud  
became hard rock.



The shapes of animals and fish  
can still be found in some rocks.  
They are called fossils.



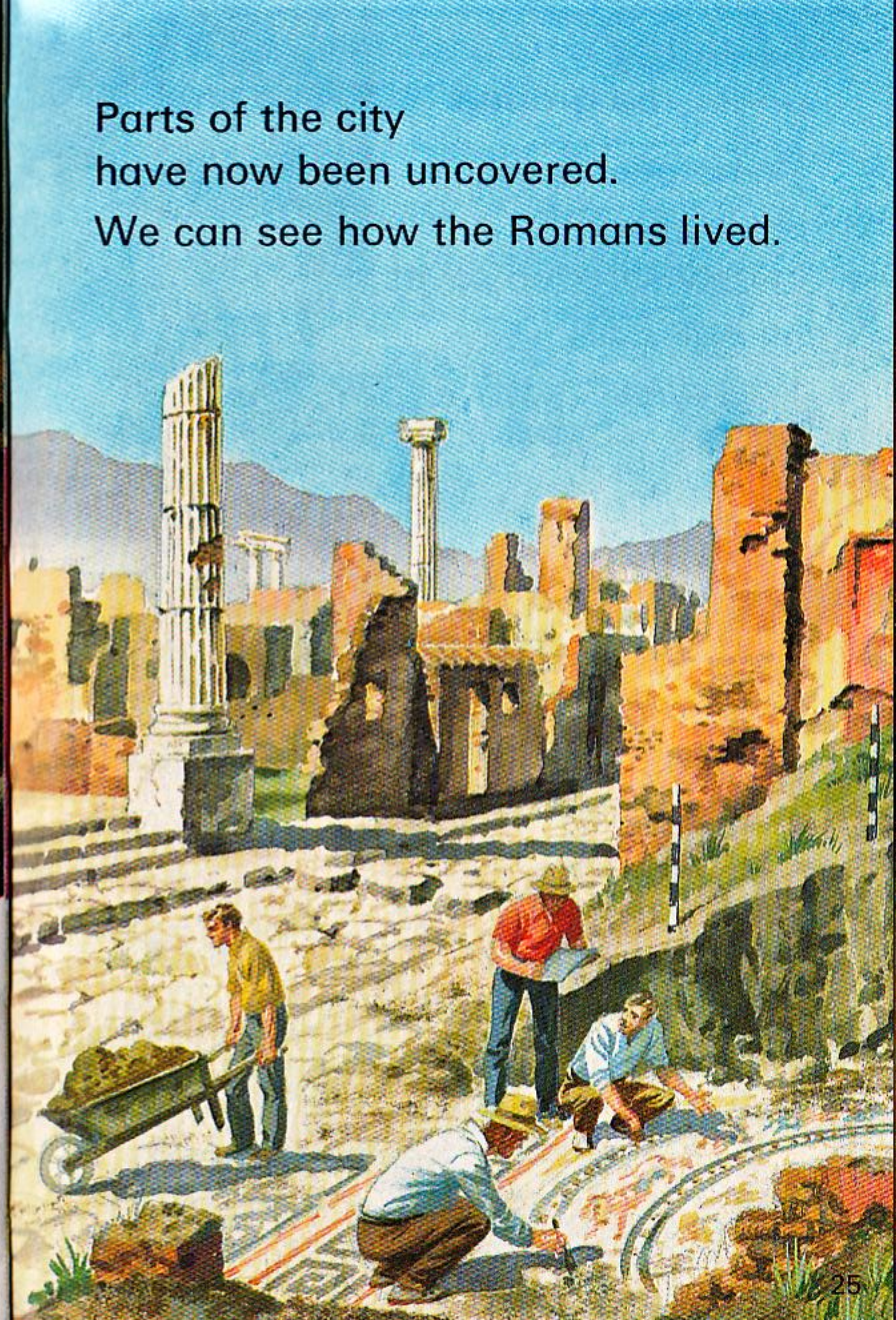


## History under the ground

The fine Roman city of Pompeii was built near a volcano.

In 79 AD the city was buried deep under hot ashes from the volcano.

Parts of the city  
have now been uncovered.  
We can see how the Romans lived.





## Exploring under the ground

Some people like exploring in underground caves and tunnels.

They wear special clothes and helmets and need ropes and torches.

*Potholers*



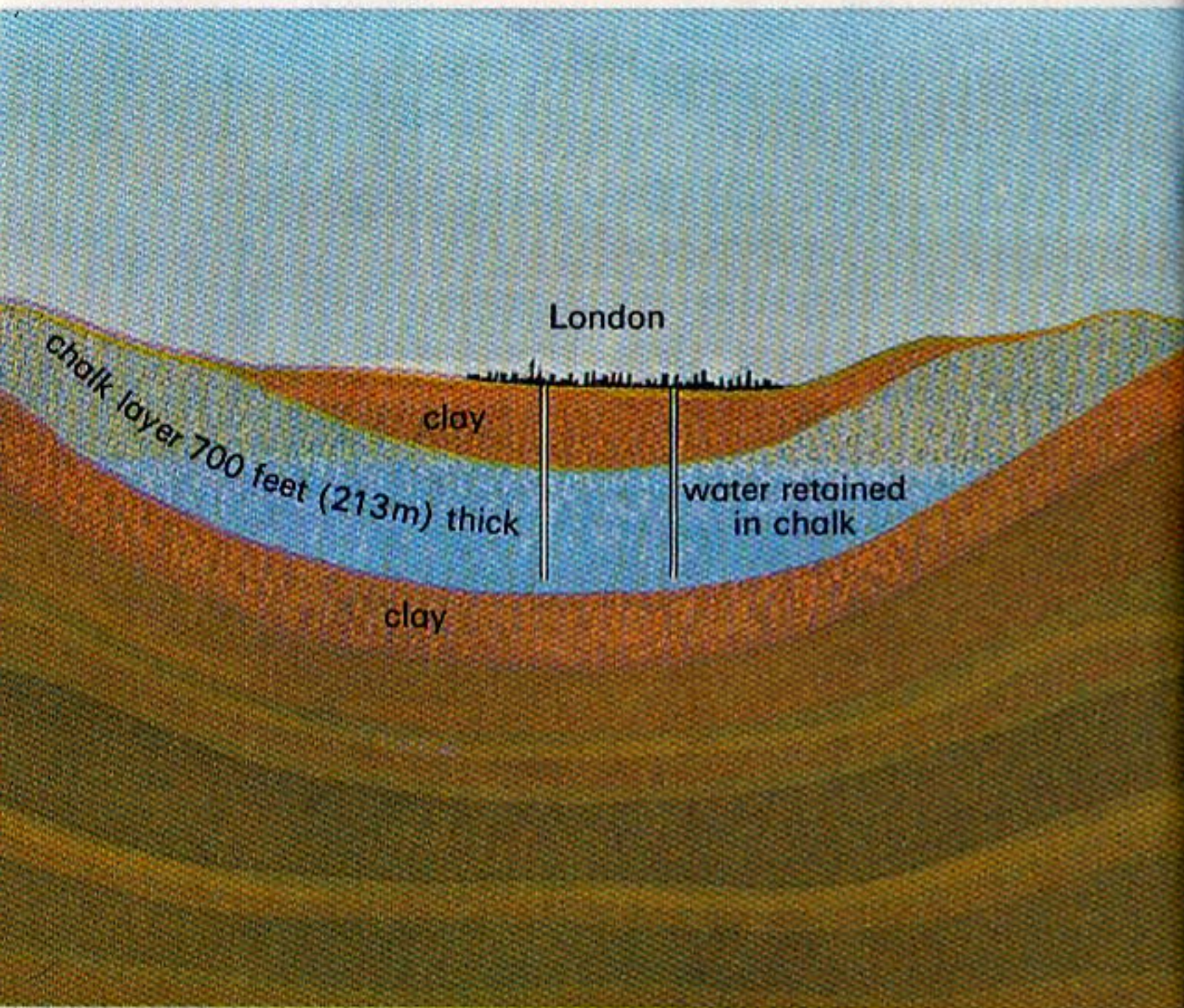
## Escaping under the ground

Sometimes prisoners-of-war dig long tunnels beneath their prison fences.

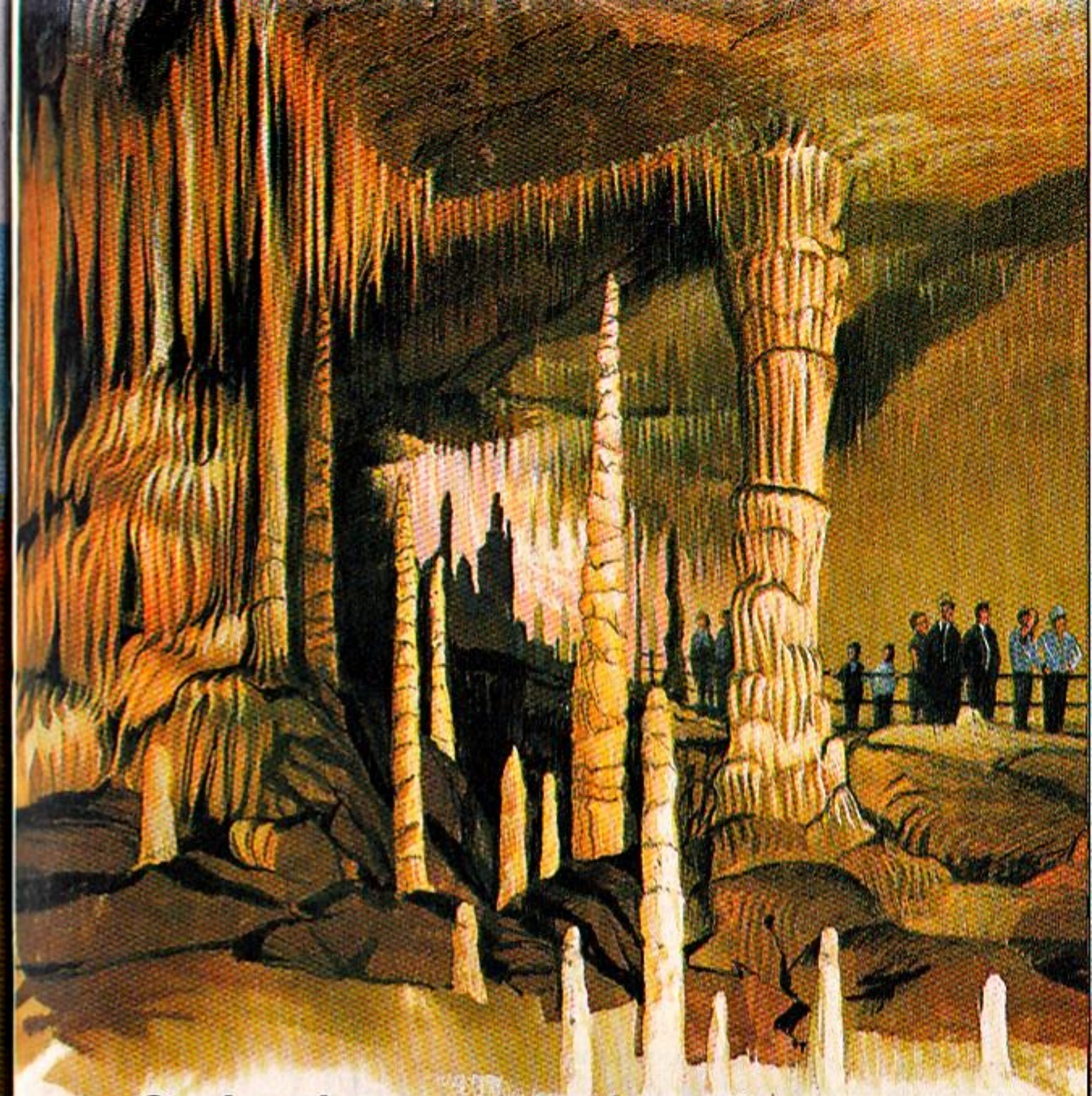
Through them they escape to freedom.



## Drinking water from under the ground



Rain can soak down into chalk.  
It cannot soak into clay.  
If the clay is under the chalk,  
the water stays in the chalk.  
It can be pumped up and used.



## Stalactites and stalagmites

When water soaks through limestone,  
it takes some of the lime with it.  
When it drips from a cave roof,  
the lime forms stalactites which hang  
and stalagmites which stand upright.



## A road under the ground

This road runs under the ground  
and also under a river.

It is the Mersey tunnel.

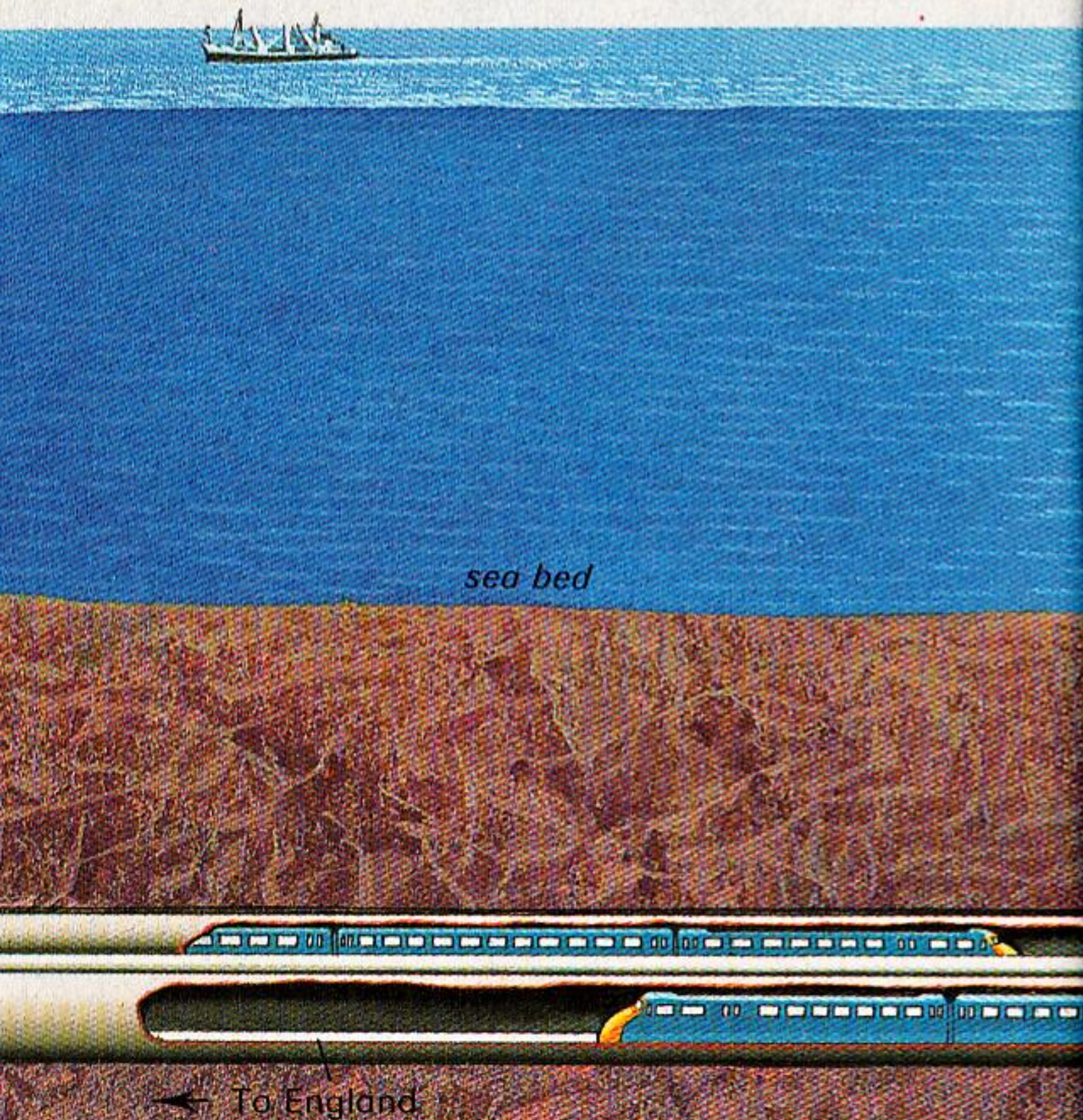
Look for it on your map of England.



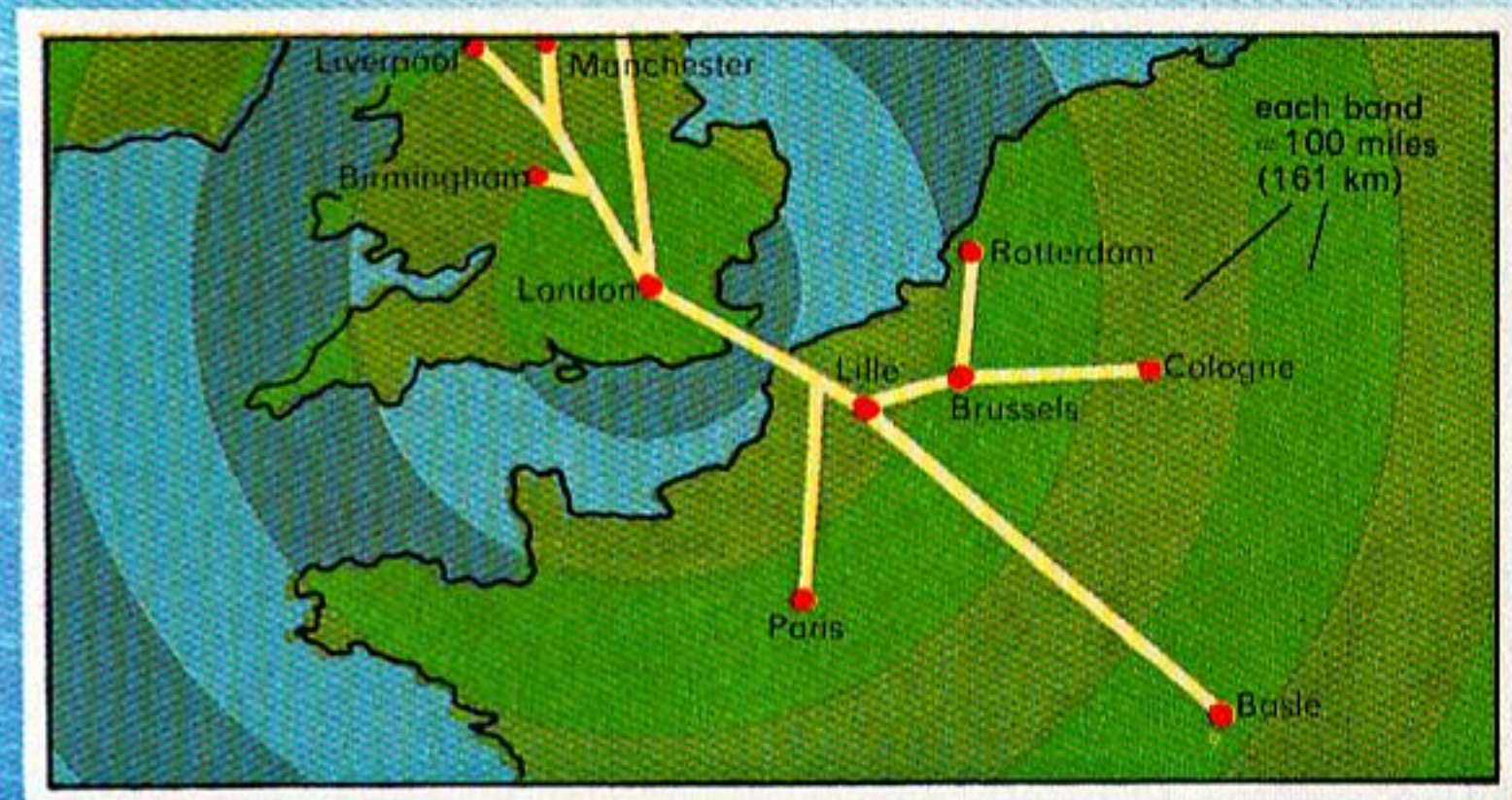


## A railway under the sea

If this tunnel is built,  
it will be the longest in the world.



It will be under the English Channel  
and join England and France.



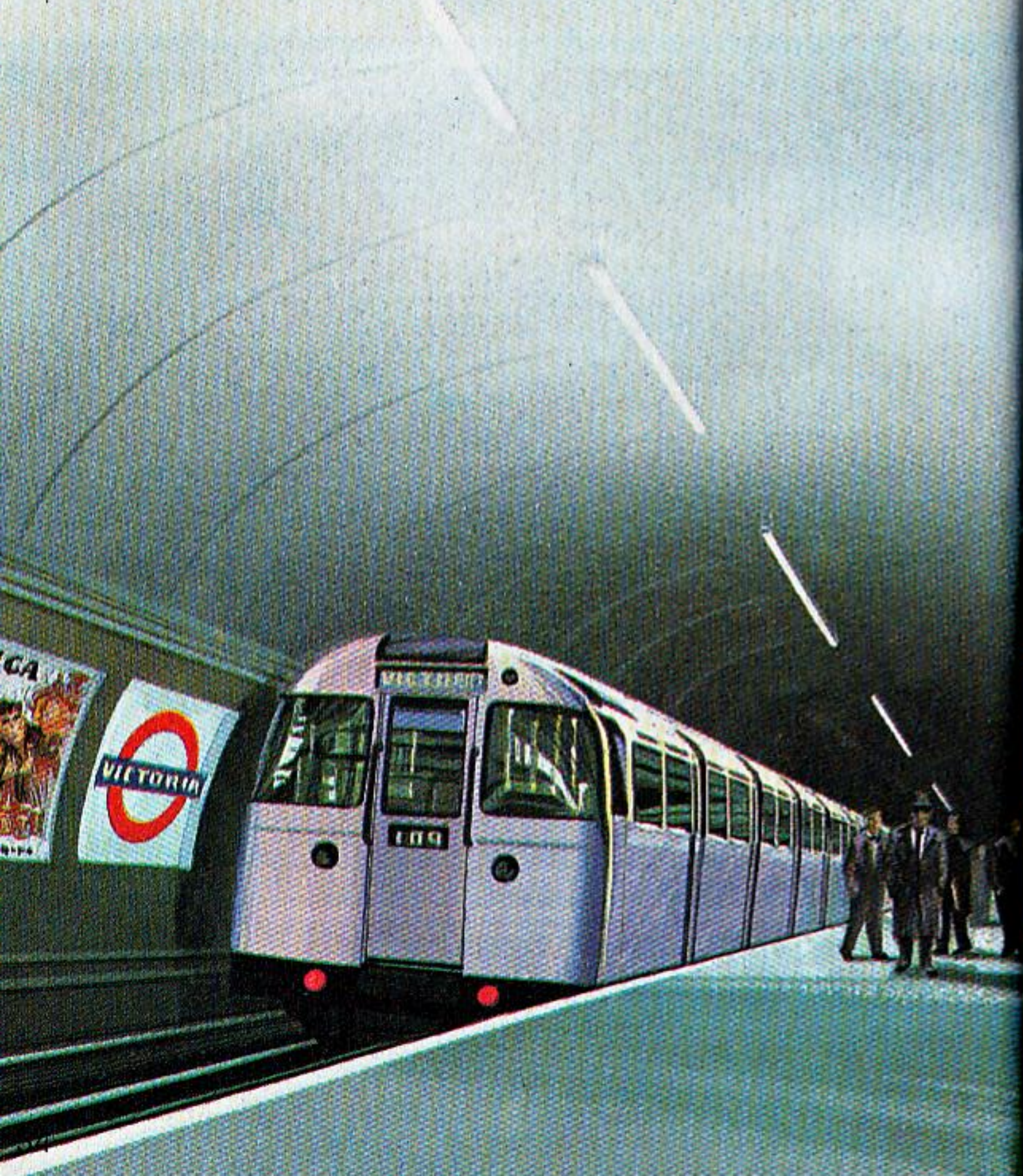
maintenance tunnel

To France →



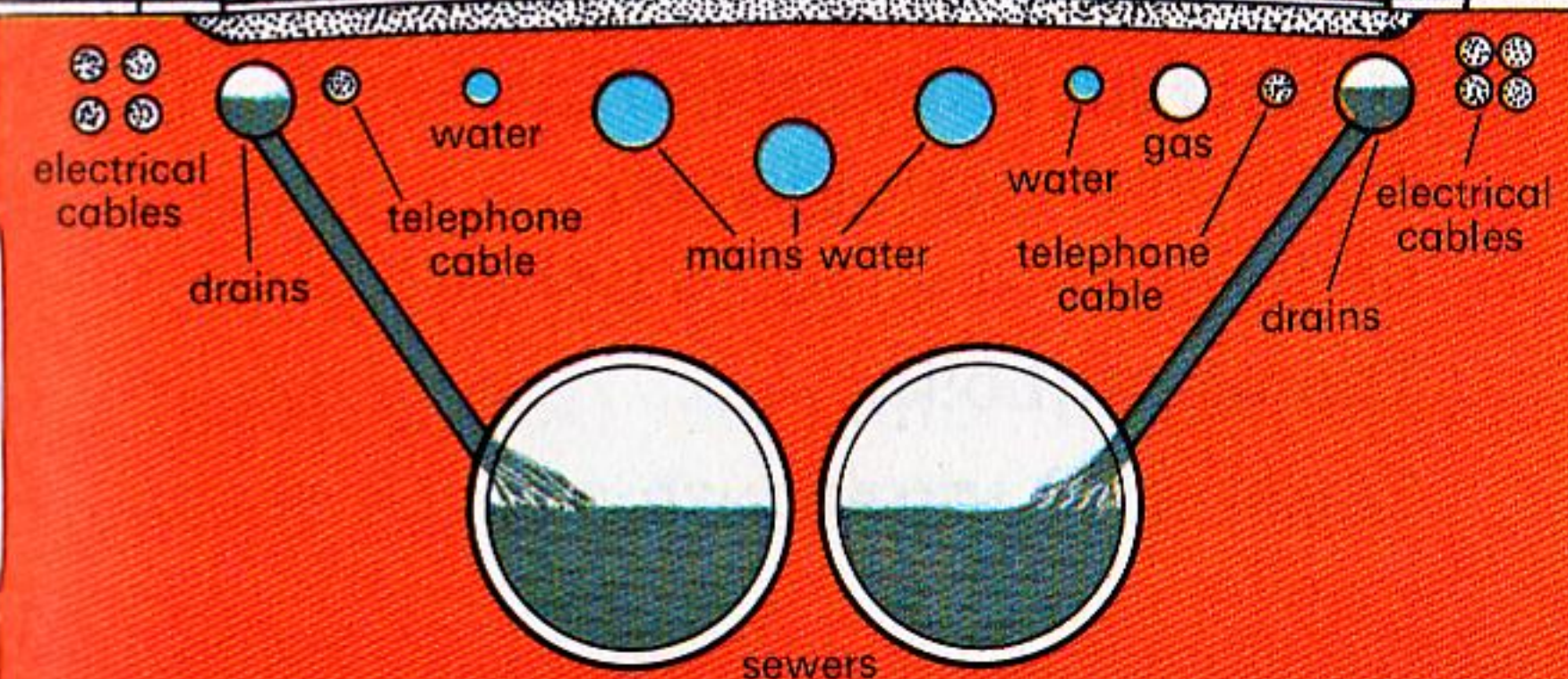
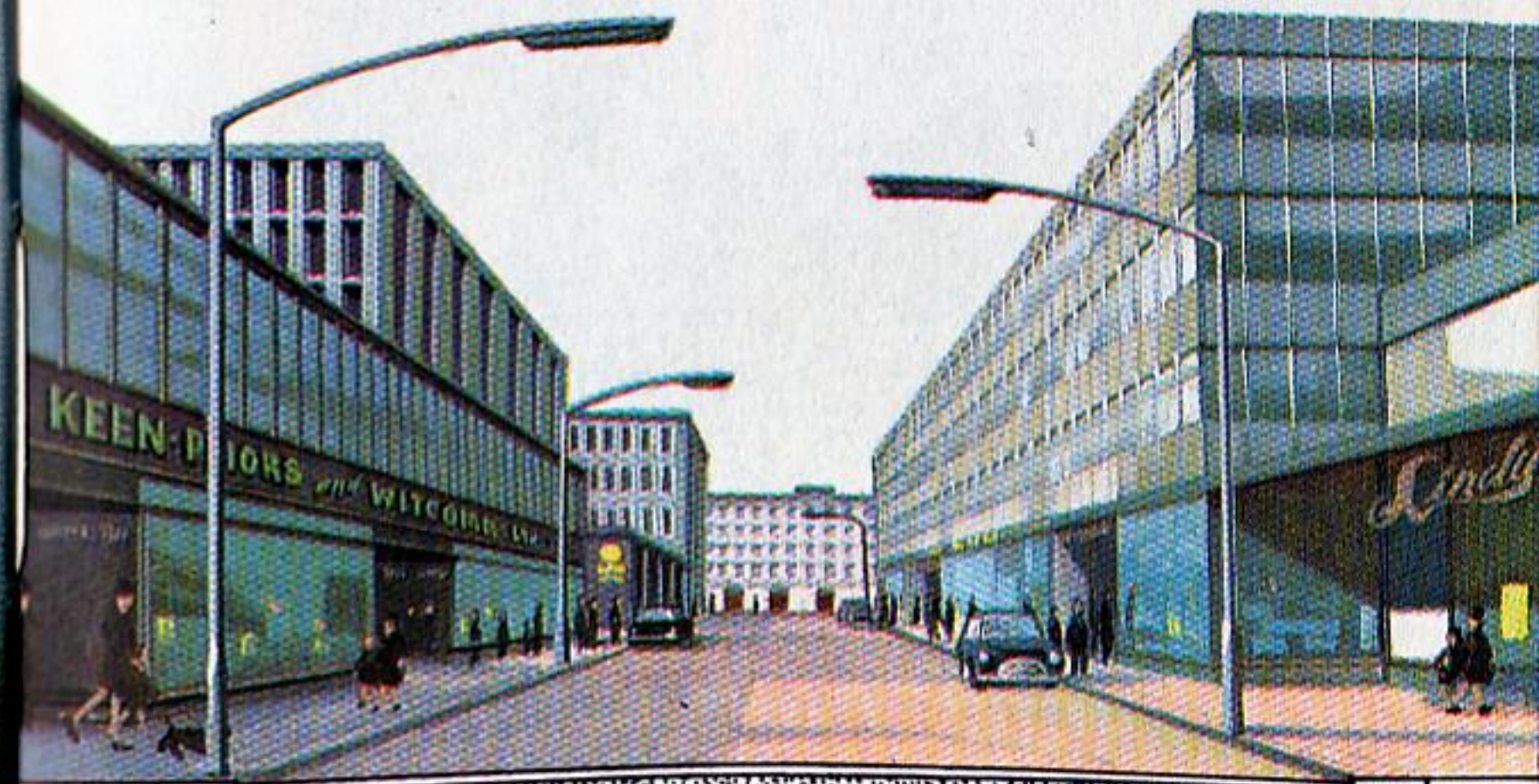
## A railway under a city

Some cities have railways that run under the ground. If people travel on these, the roads are less crowded.



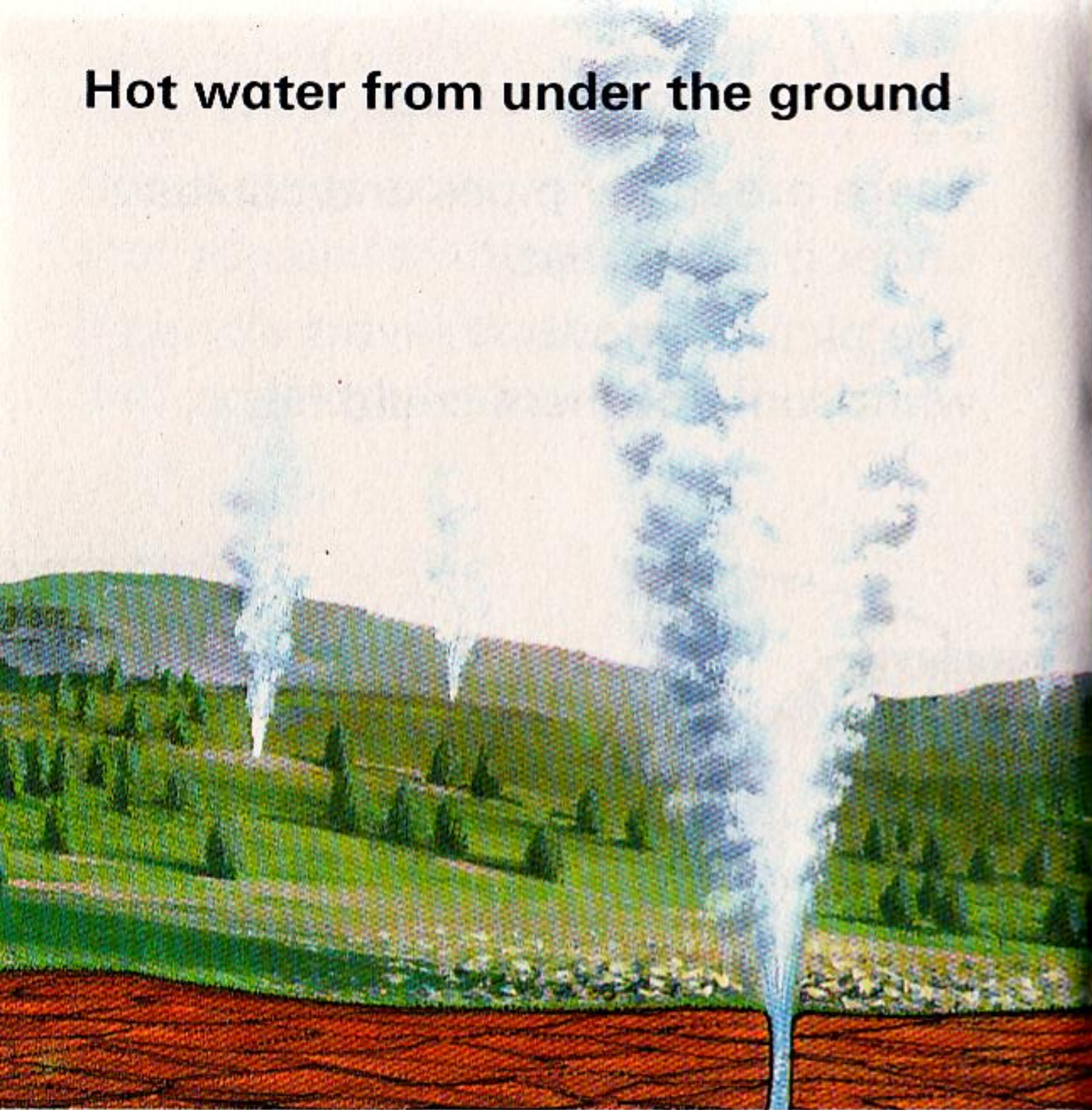
## Pipes and cables under a city

There are many pipes and cables under a city street. The picture shows what some of them could be.

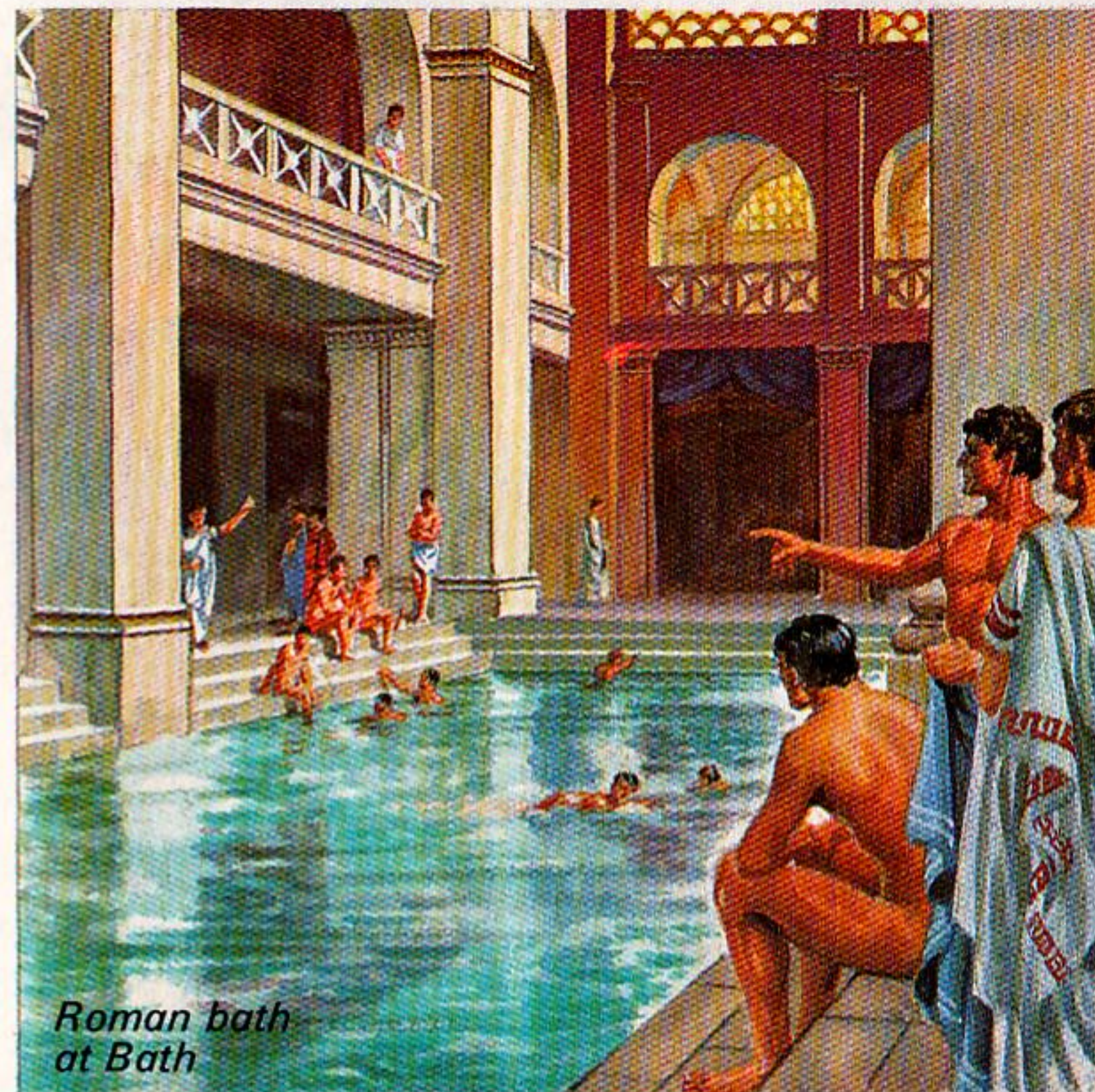




## Hot water from under the ground



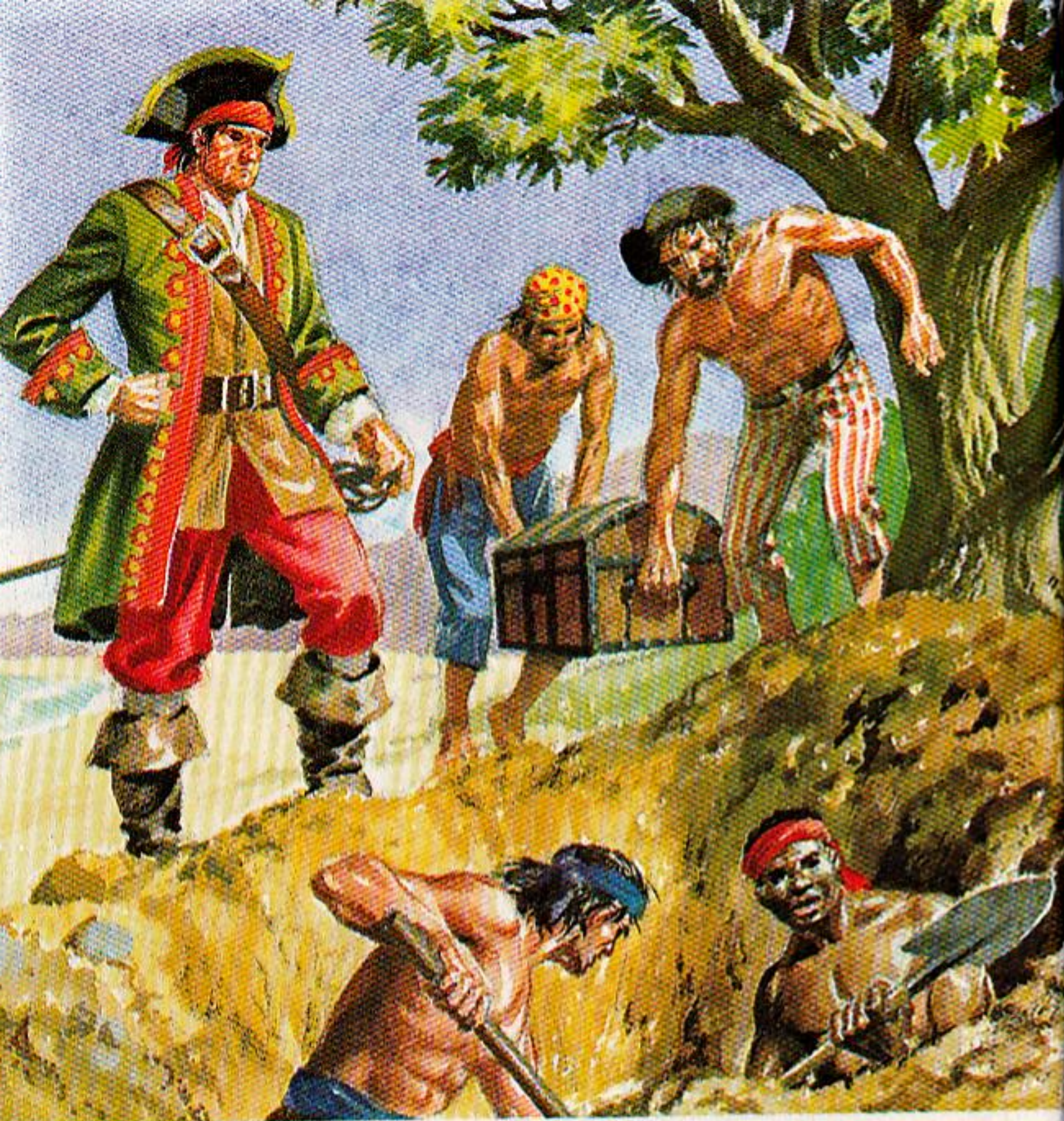
In Iceland, New Zealand,  
and some other places,  
underground streams get hot.  
The water boils.  
Steam and spray gush out.



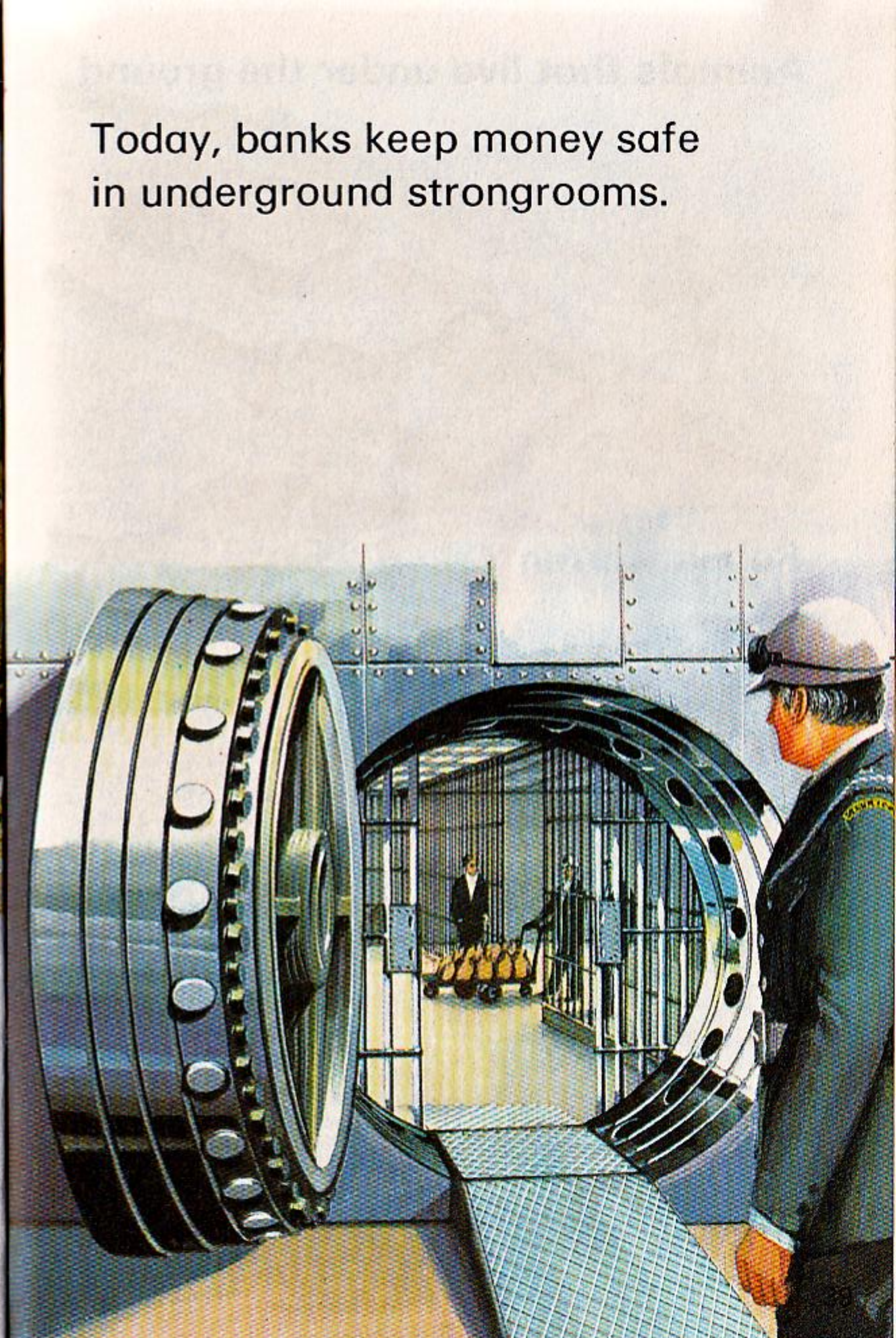
*Roman bath  
at Bath*

This bath was built by the Romans.  
It is filled by a hot stream  
from under the ground.  
Today, 2,000 years later, it still flows  
at the same speed and temperature.





Today, banks keep money safe  
in underground strongrooms.



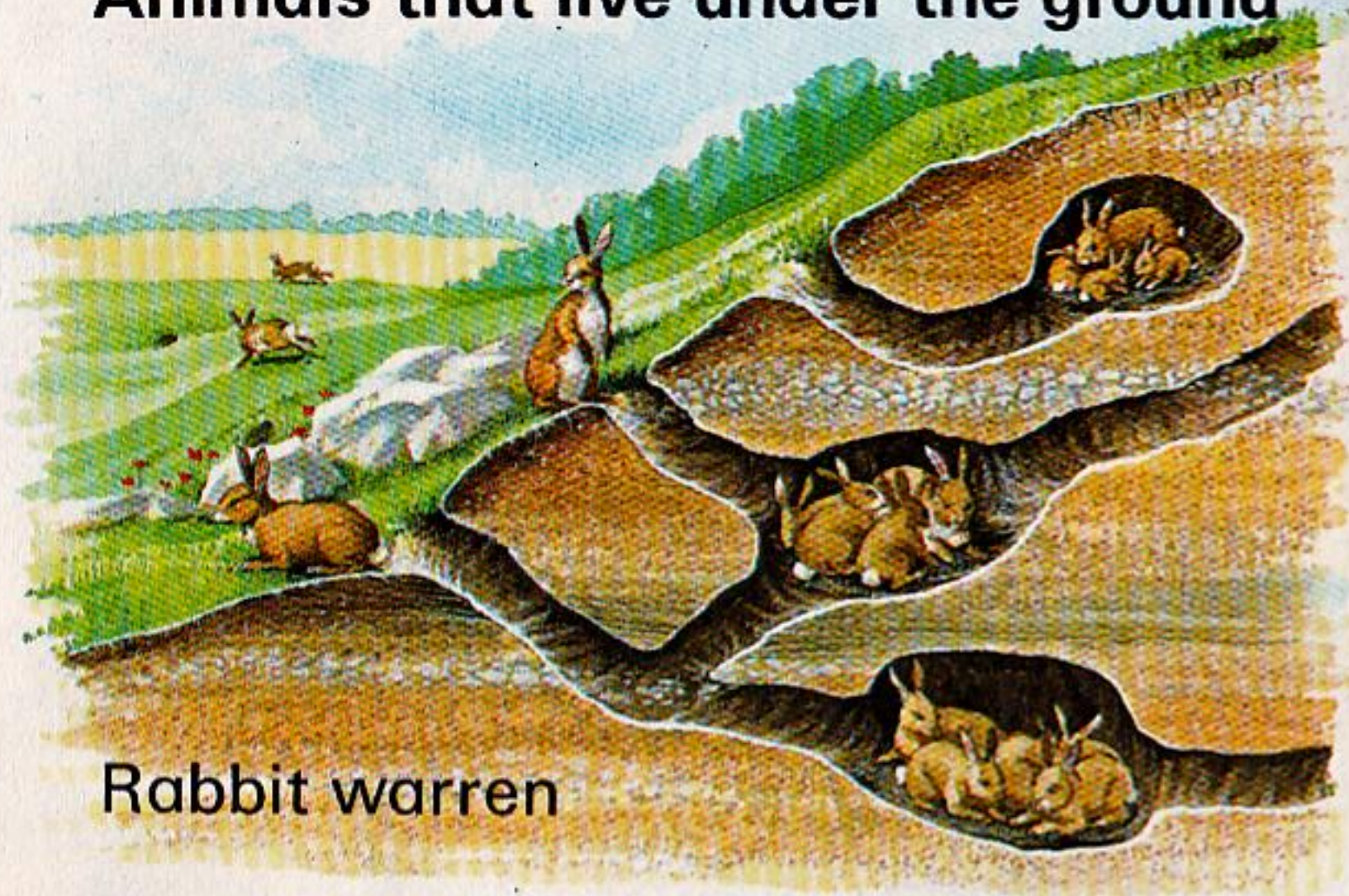
## Money under the ground

Often pirates hid their treasure  
in holes in the ground.

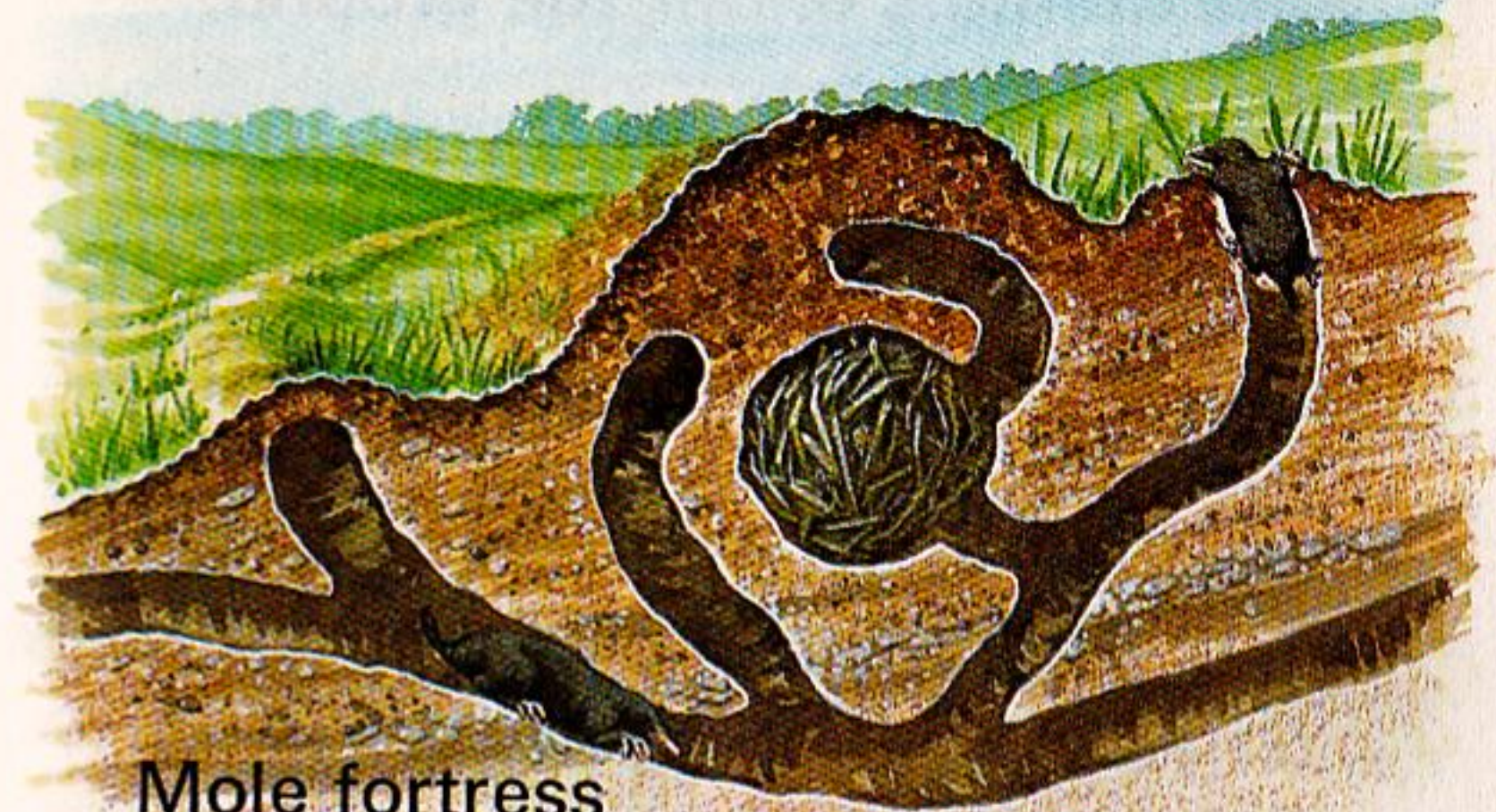
These holes made safe hiding places.



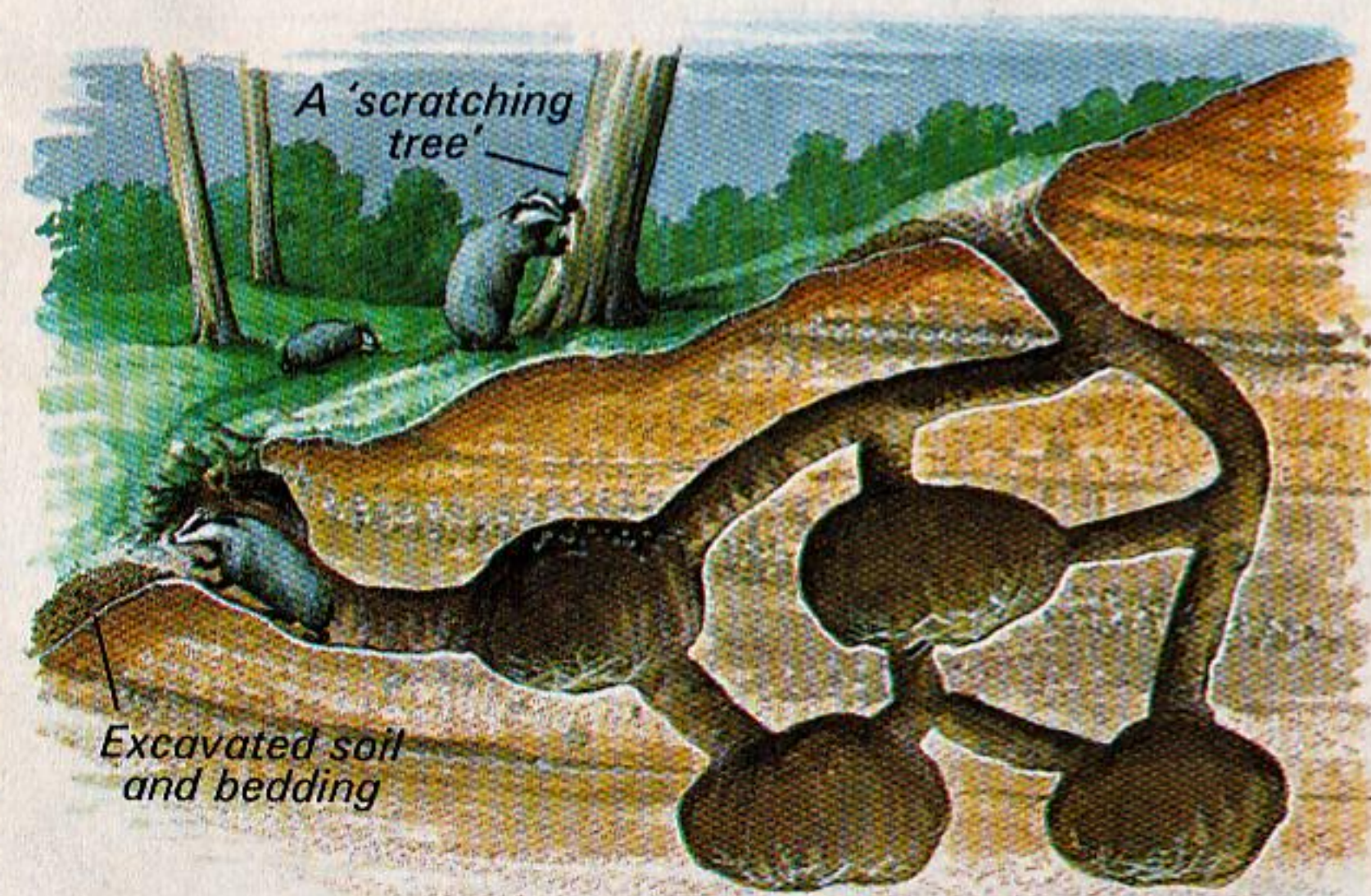
## Animals that live under the ground



Rabbit warren



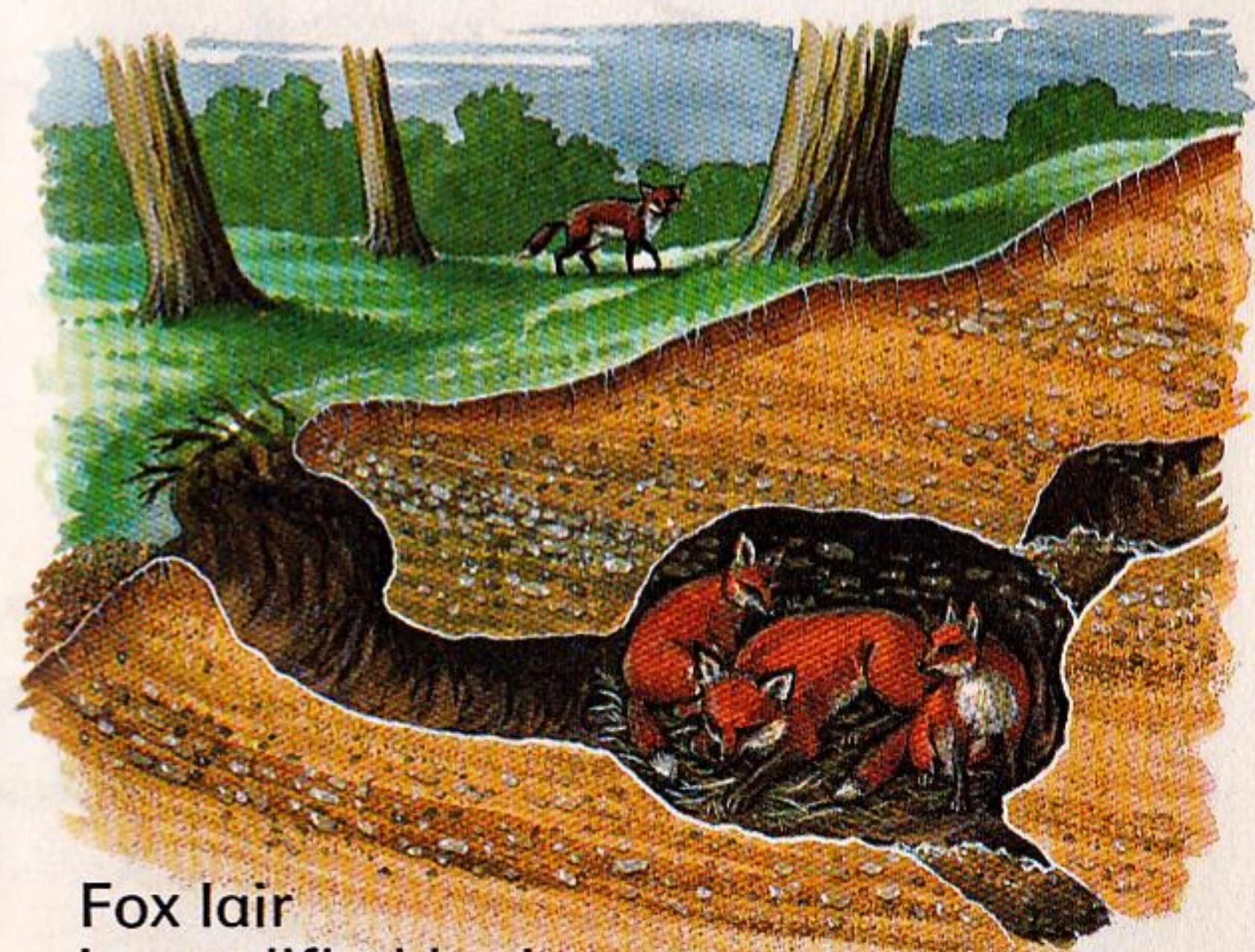
Mole fortress



A 'scratching tree'

Excavated soil and bedding

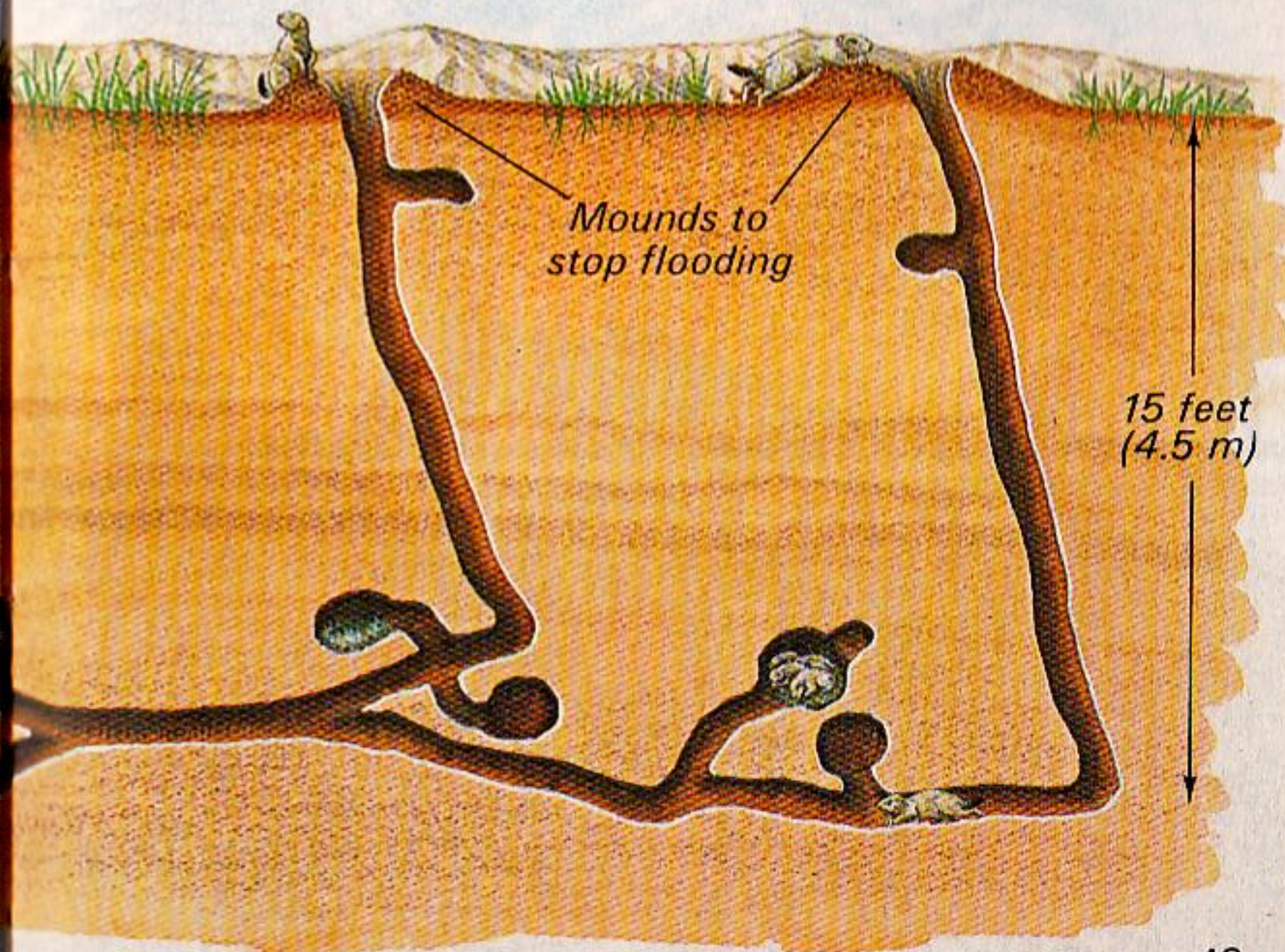
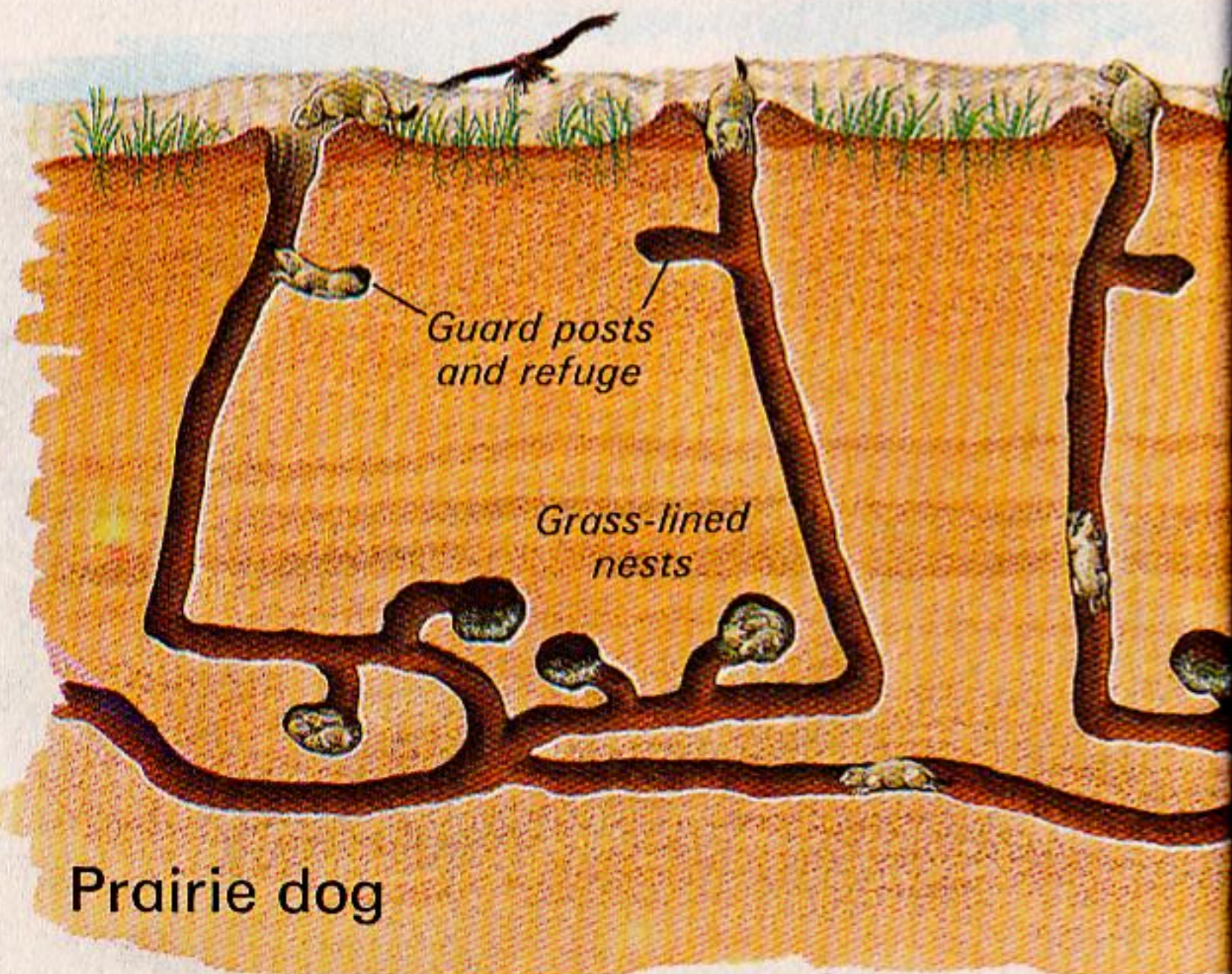
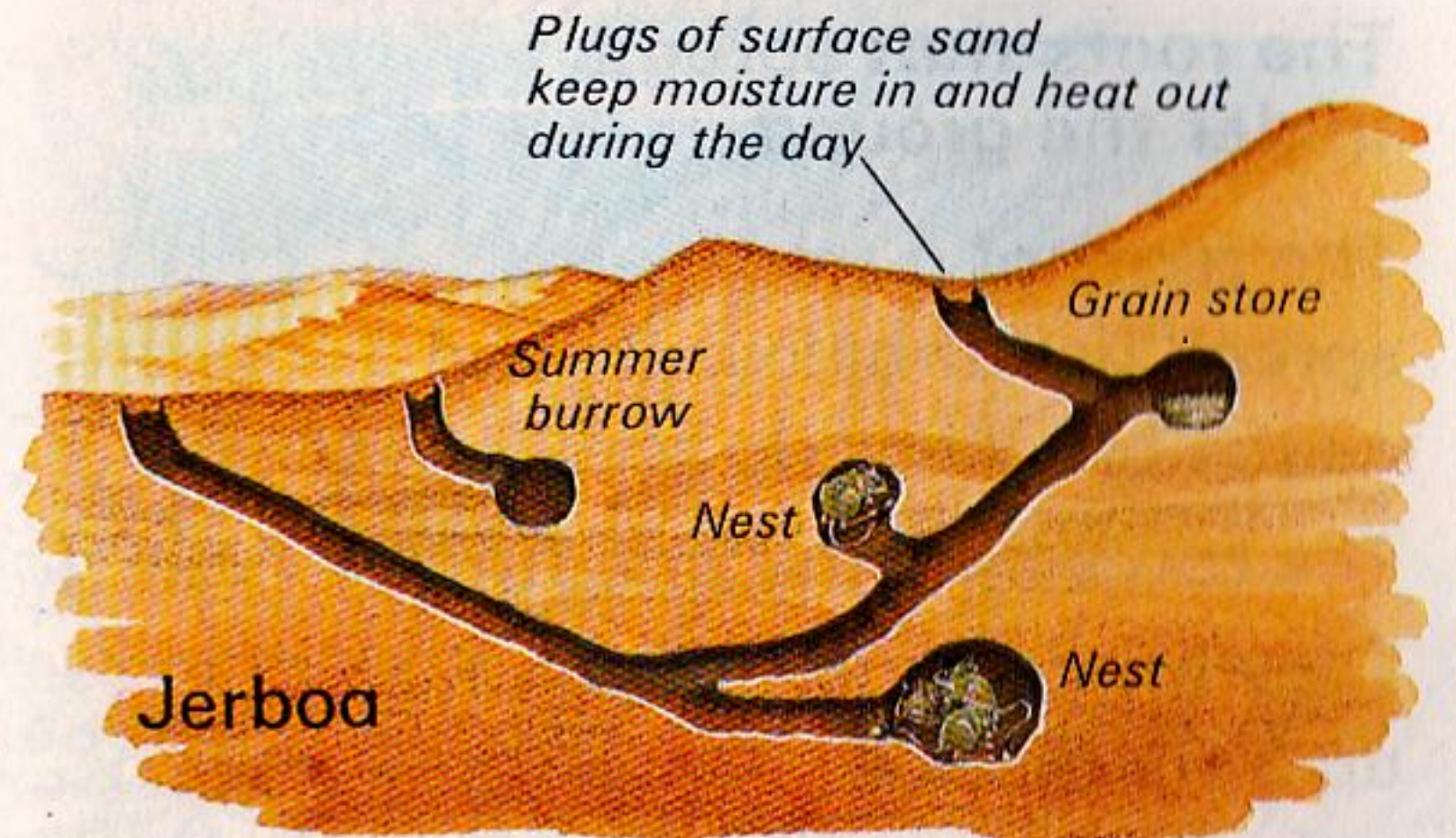
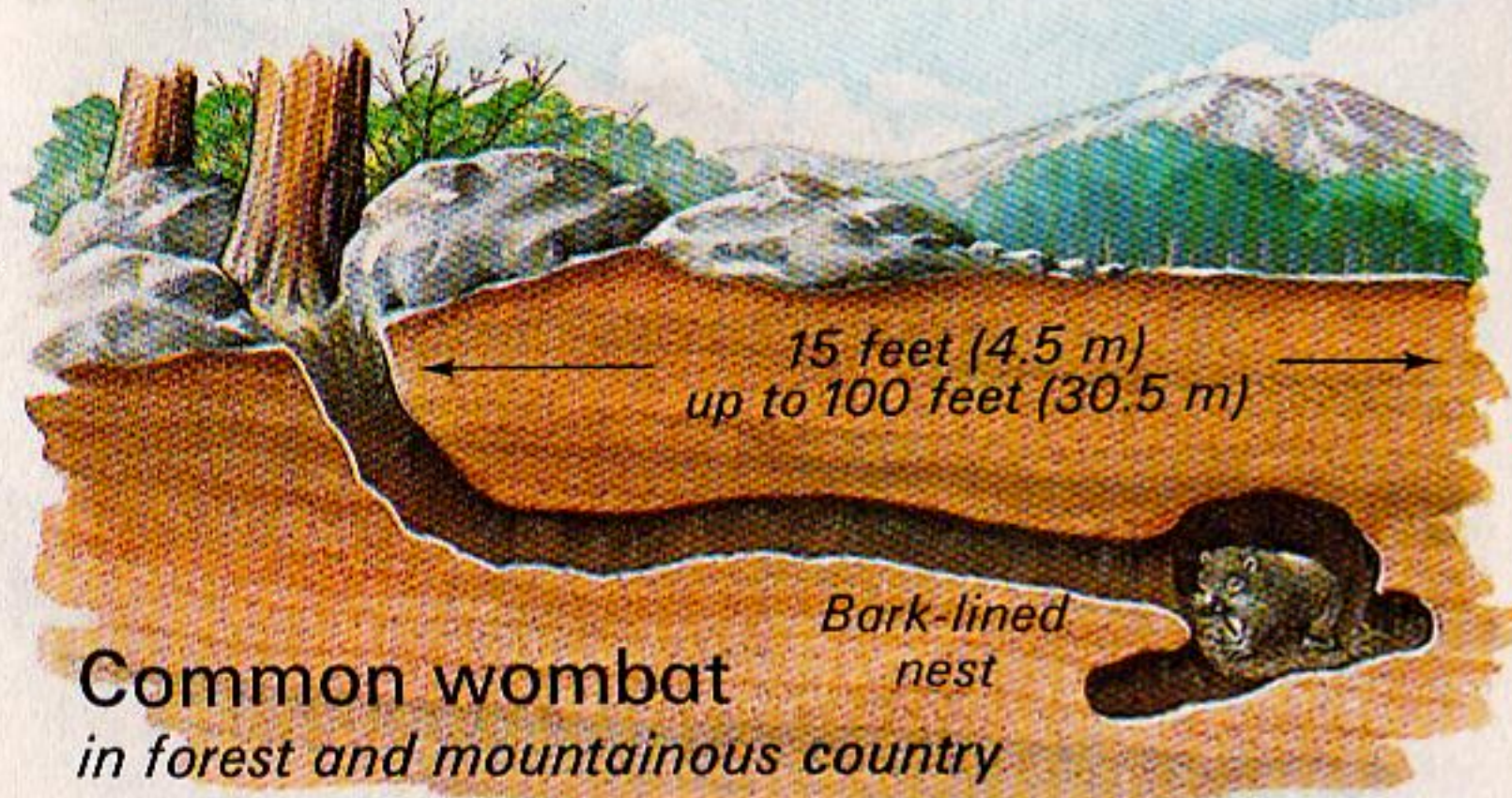
Badger sett



Fox lair  
in modified badger sett



## More animals under the ground.

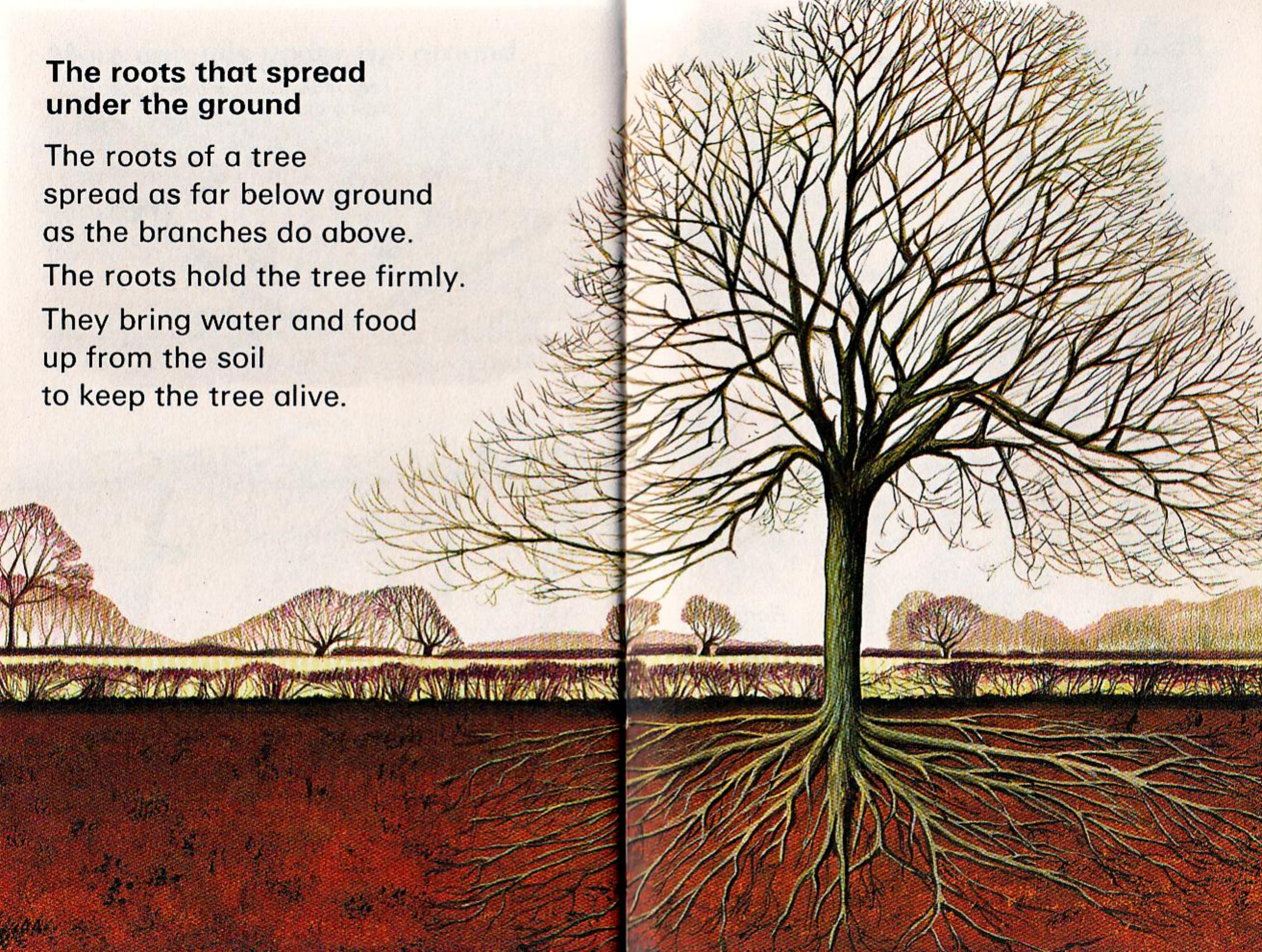




## **The roots that spread under the ground**

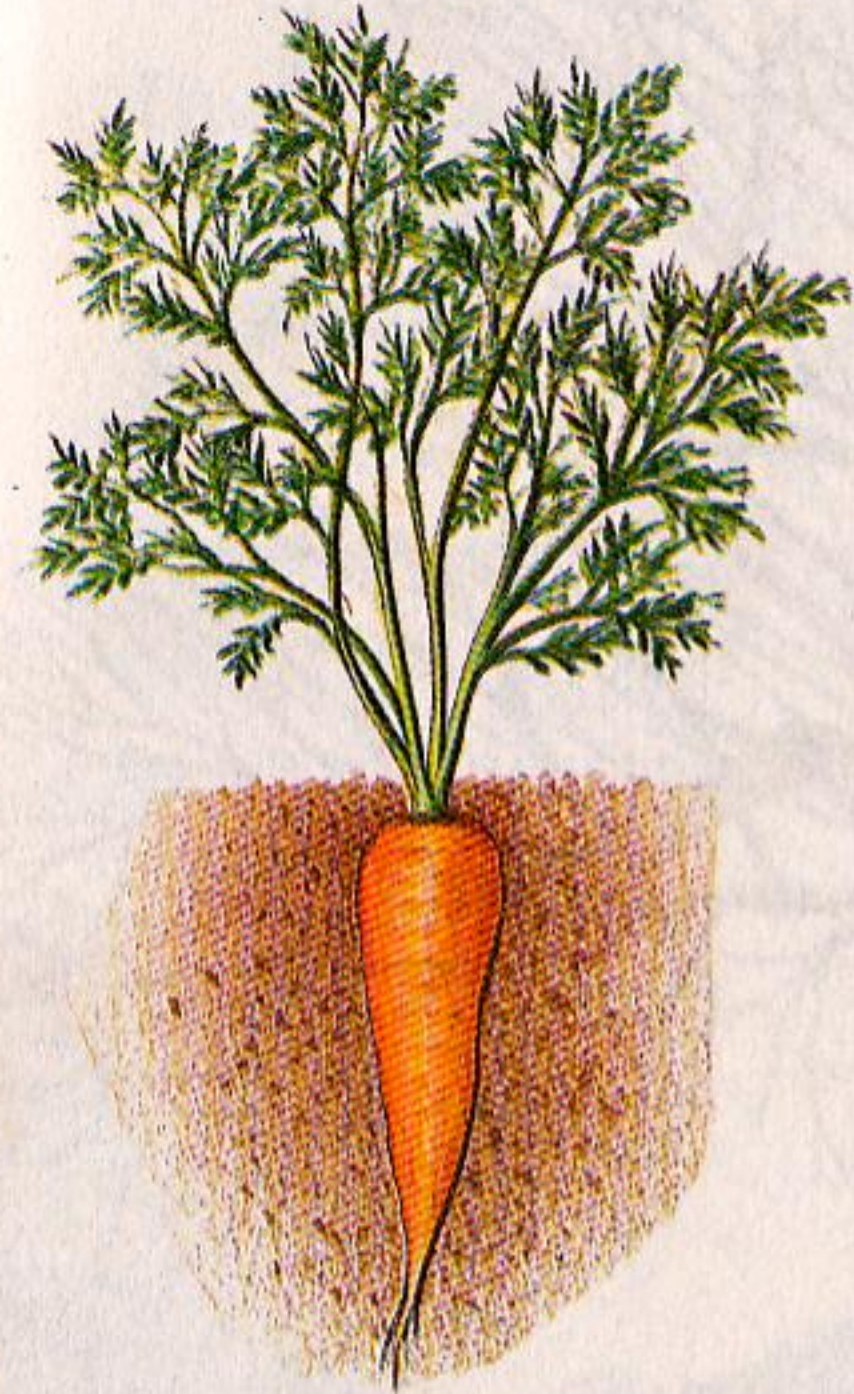
The roots of a tree  
spread as far below ground  
as the branches do above.

The roots hold the tree firmly.  
They bring water and food  
up from the soil  
to keep the tree alive.

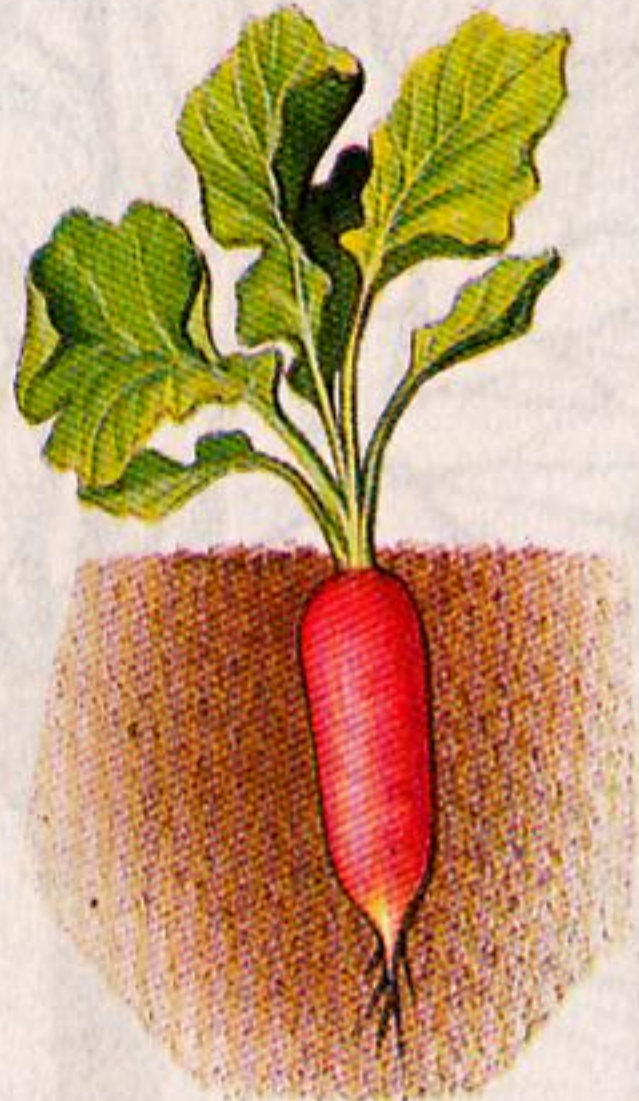




## Food from under the ground

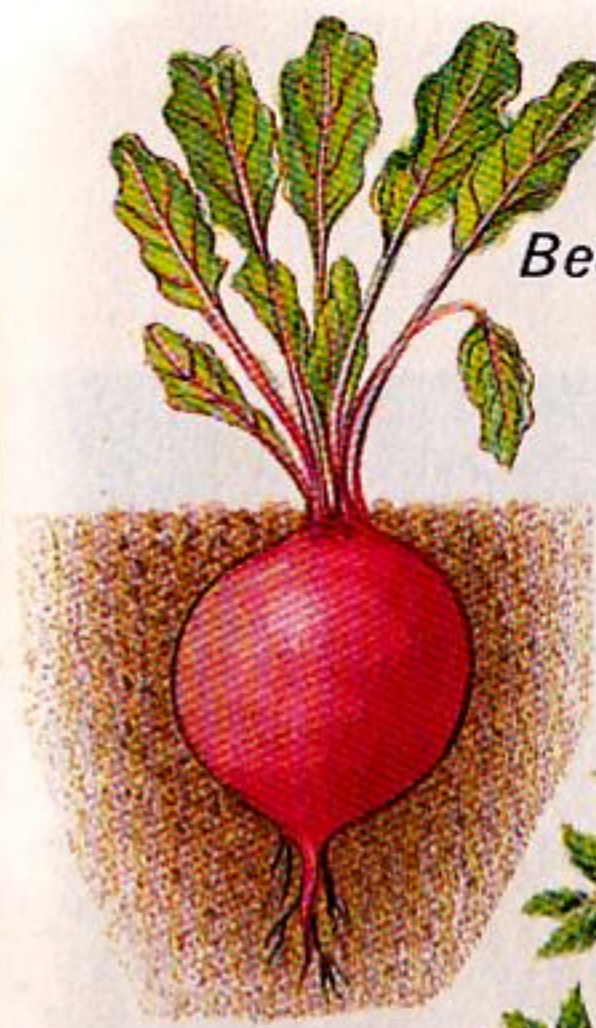


*Carrot*



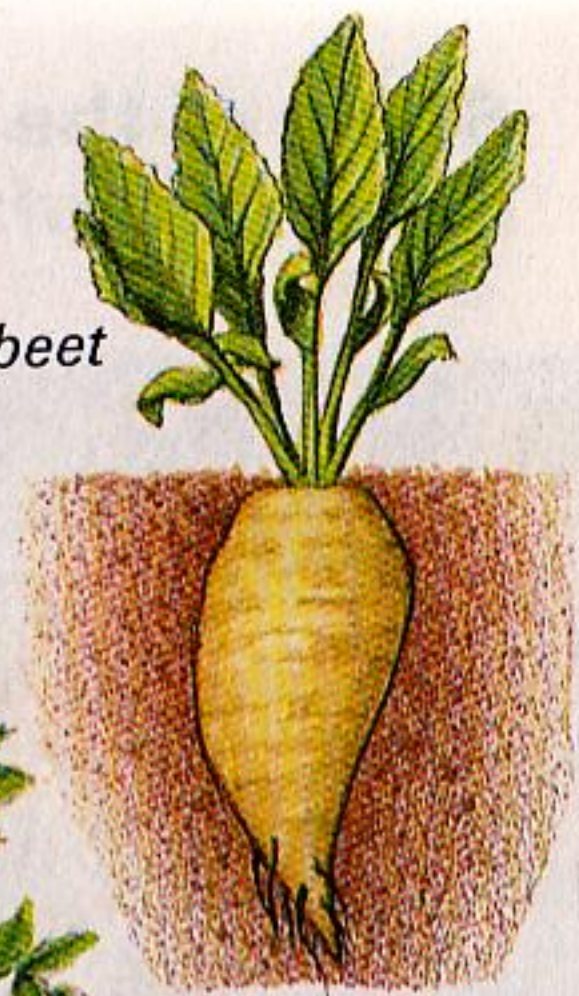
*Radish*

Some food has to be dug  
from under the ground.  
These are called root crops.

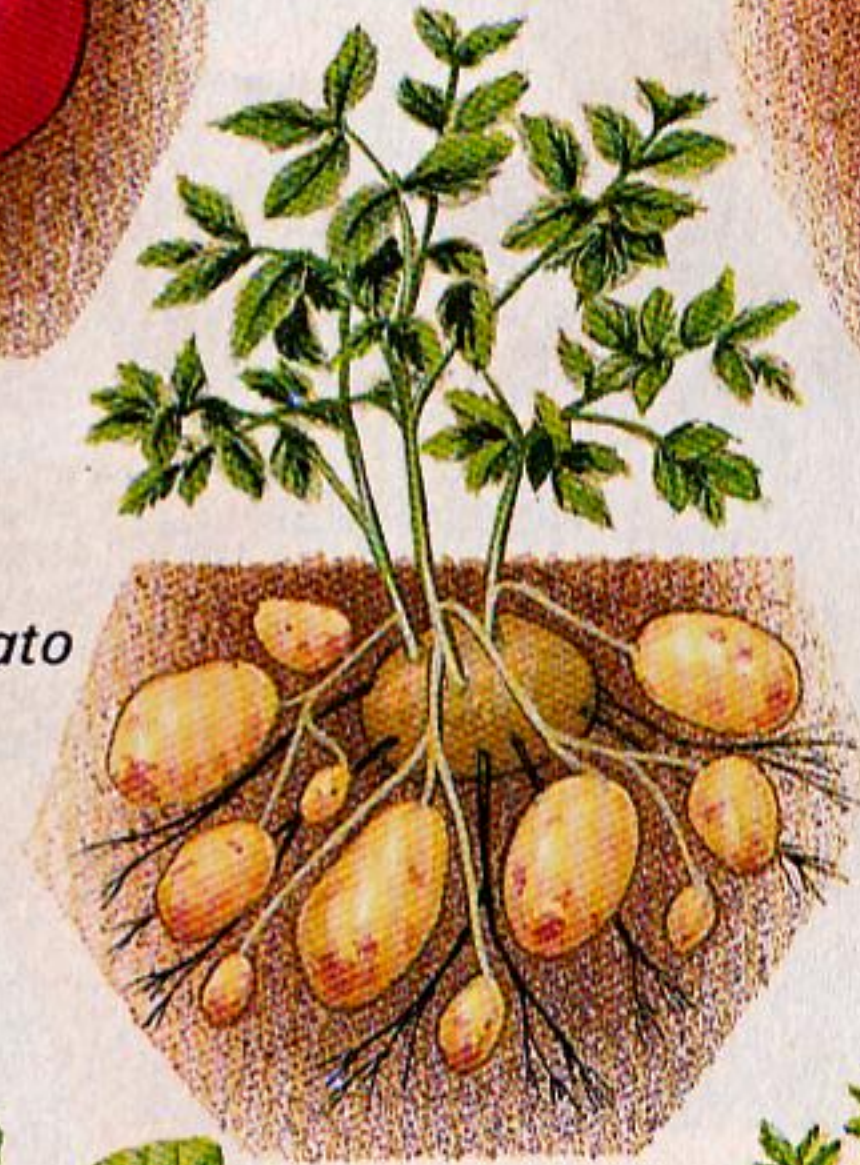


*Beetroot*

*Sugar beet*



*Potato*



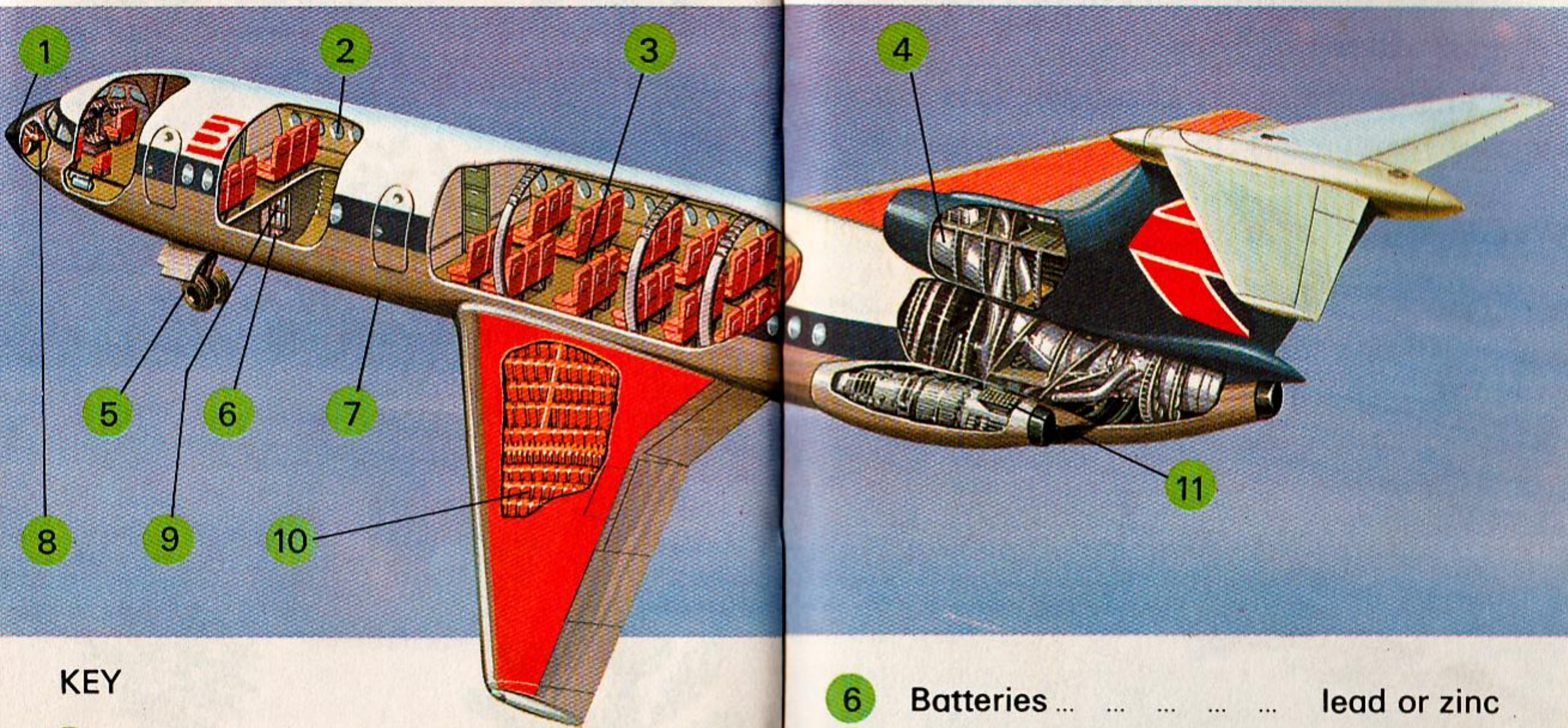
*Turnip*



*Parsnip*



## Some of the minerals used in an aircraft



### KEY

- 1 Nose ... .. plastic (from oil)
- 2 Windows ... .. glass (from silica)
- 3 Interior fittings ... .. plastic (from oil)
- 4 Engine intake... .. steel and chromium
- 5 Tyres ... .. rubber (with sulphur)

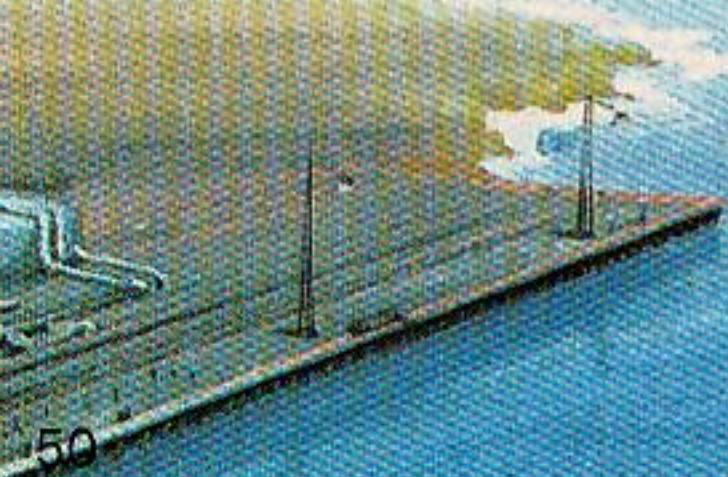
- 6 Batteries ... .. lead or zinc
- 7 Body ... .. aluminium
- 8 Search radar ... .. uses copper
- 9 Transistors ... .. use silicon
- 10 Fuel ... .. made from oil
- 11 Thrust reverser ... .. uses titanium



Cars, aircraft, ships,  
factories and homes  
use up huge amounts of oil  
and other minerals.

Perhaps there are already  
too many cars and aircraft.

*This jumbo jet uses  
12.2 tonnes an hour when cruising.  
It carries 158.5 tonnes of fuel.*



Many people think we waste  
too much oil.  
Some of the minerals we need  
are already scarce.  
One day,  
there may be no more of these  
under the ground.



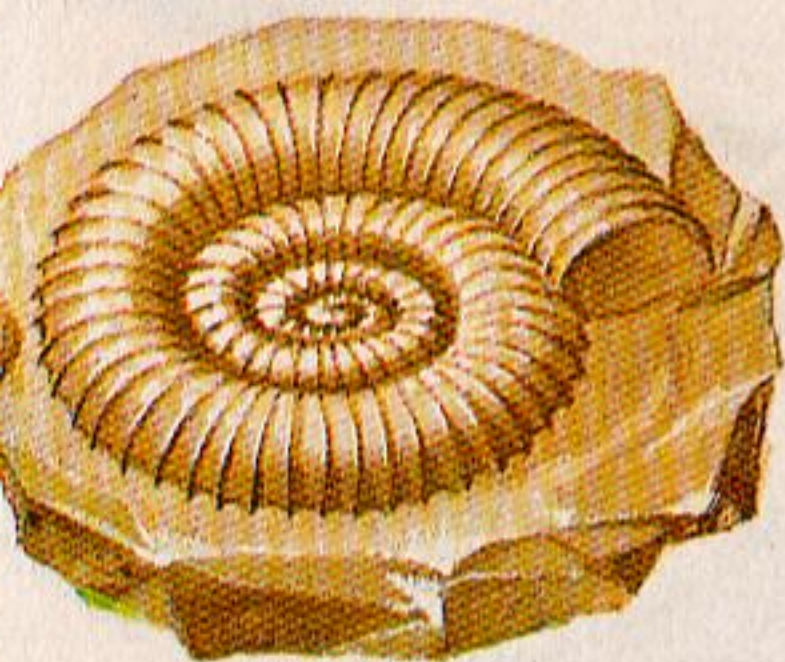
*This tanker carries  
256,032 tonnes of oil*



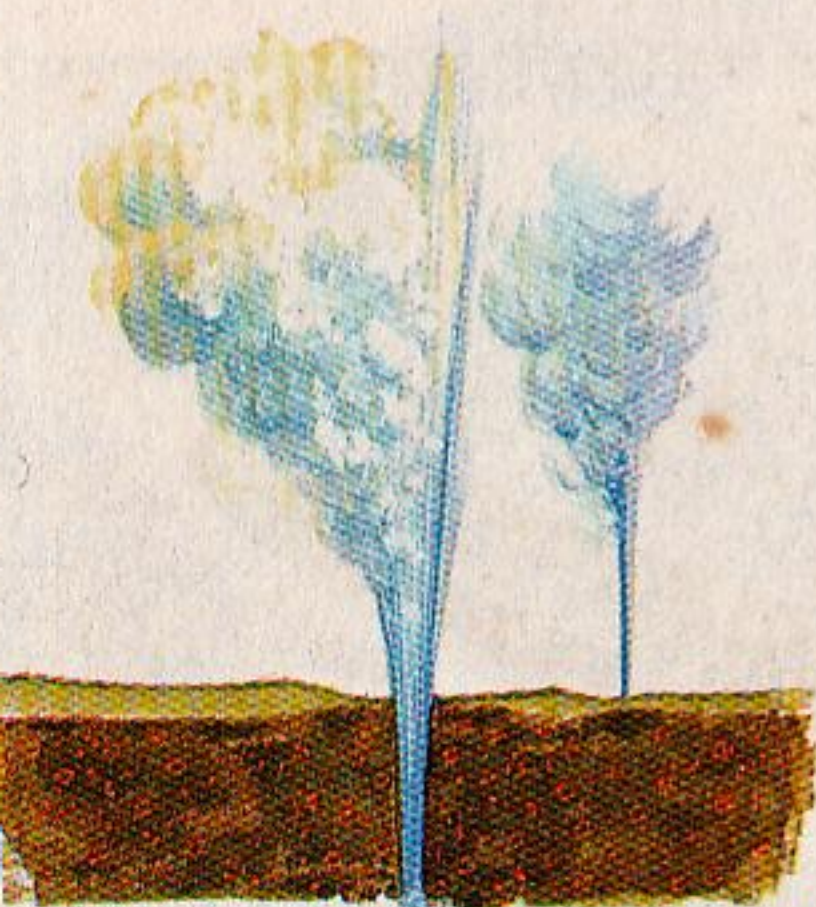




Flint



Fossil



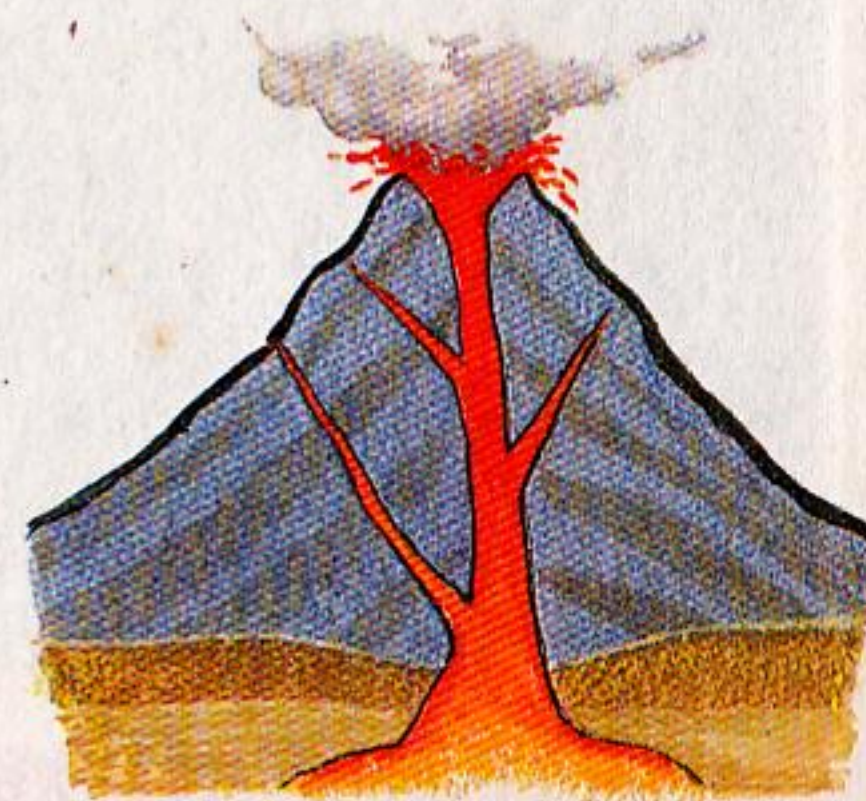
Geyser



Stalactites



Stalagmites



Volcano